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JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL,

EDITED BY

THE SECRETARIES.

VOL. XXIII.

Nos. I. to VII.—1854.

“It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away, if they shall entirely cease.—SIR WM. JONES.

CALCUTTA:

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1855.

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. I.—1854.

A Twenty-second Memoir on the Storms of the Indian and China Seas ; Cyclones and Tornadoes of the Bay of Bengal from 1848 to 1852. By HENRY PIDDINGTON, President of Marine Court.

The publication of these Memoirs is often delayed longer than is perhaps agreeable to those who look for them, as being interested in the subject, and by those who, having contributed notices are desirous of seeing the results of them announced. This arises from various causes, the principal of which is that it is often necessary where the data are incomplete, to wait a long time for the return of outward bound ships from Europe, and then that in the interval some new and more urgent claims to the little time I can devote to them arises, and thus they fall into arrears. I should also in fairness add to this little explanation, my unwillingness to trespass on the kindness of the Editors of the Journal, who must afford to each of the various classes of their readers and contributors a fair share of space.

The present Memoir then comprises the investigation or notices of ———

- I. The Noacolly Tornado of May, 1844.
 - II. The *Nussur's* Tornado of July, 1848.
 - III. The Chittagong (stationary) Cyclone of May, 1849.
 - IV. The *Erin's* Cyclone in the Preparis Passage and Andaman Sea, of November, 1850———making thus a series of short Memoirs
- No. LXV.—NEW SERIES. VOL. XXIII. B

each of which is separately considered before the next is entered upon. The three first will be found to be highly interesting to Meteorologists, as connecting, so to say, the Tornado with the stationary Cyclone, and the last from its remarkable track between two Volcanic Islands!

I.

THE NOACOLLY TORNADO OF 1814.

From the *Bengal Hurkaru* of 23rd May, 1814, I have abridged the following account of a very violent tornado-Cyclone which appears to have travelled to the Eastward of the Meridian.

“ On the 11th instant this station (Noacolly) was visited with the most violent tornado (if I may be allowed the expression) that has occurred within the memory of the oldest inhabitant. It began to blow very strong from the S. E. at day break, and the gale continued to freshen to 11 o'clock, when its fury became irresistible. After blowing about two hours from the East and South East the wind veered round by the Northward and returned with redoubled violence carrying every thing before it. Providentially it abated at 4 P. M., for had it continued during the night, dreadful would have been the consequences.” The writer then goes on to detail the danger sustained at the station in houses, bungalows, trees, cattle, native huts, boats, &c., and the sea rose above ten feet above its usual level, doing vast mischief by the inundation, and as an example of the force of the wind, he states that the Surgeon of the station whose bungalow was destroyed, though a stout athletic man, was repeatedly blown down in the fields while endeavouring to reach another house for shelter, and was an hour and a half travelling the distance of half a mile, and that thatched roofs and beams were blown to incredible distances.

In violence, then, there is therefore no doubt that this equalled a West Indian hurricane. And if we take the veering to have been, as well as we can make out from this account, from S. E. to North, this would give it a track to the E. N. E. from the W. S. W.

This tornado was also felt in great fury, for about four hours at Chittagong, where the rise of the water is stated to have been seven or eight feet beyond the mark of the high spring tides. I have not

been able to discover any farther notices of its ravages, nor any data as to the time at which it was felt at Chittagong, which being only sixty miles to the S. S. E. of Noacolly it is quite possible that it was the southern part of the same Cyclone in its passage as above described.

II.

THE SHIP NUSSUR'S TORNADO.

Abridged Reports of Mr. BRANCH PILOT SHEARMAN RANSOM to Captain H. L. THOMAS, Master Attendant, Calcutta.

I have the melancholy duty to report the loss of the Barque "*Nussur*" near the Outer Floating Light about 2 A. M. this morning. I have succeeded in saving nine men whom I picked off the floating wreck; they relate that the ship was struck by a very heavy squall and capsized, foundering immediately. They can give no account of the Captain, Officers, or Pilot; the last seen of them was, that they were standing together on the poop. I have made all possible search among the mass of wreck but cannot find any trace of Europeans. I am obliged to curtail this account as a ship is in waiting for a Pilot. We experienced a heavy gale for a few hours from midnight to 4 A. M. this morning, I stood to sea and have escaped without damage.

No. 2.

In my letter to you of the 16th instant I was compelled from the want of time to give you but a very short account of the weather and occurrences at this station during the 15th, 16th and 17th instant, I beg to forward the following in continuation.

The 15th commenced with fresh breezes and squally from East and veering by 3 P. M. to N. N. W. but very uncertain in strength, passing showers of rain and a heavy swell from the Southward, I consulted the two Barometers which I have frequently, and found that they continued falling all day; at 6 P. M. they were at 29.56 and did not go lower during the breeze. I was under weigh all this day expecting some vessels out; 3 P. M. I took Mr. Fielder, Mate, out of the "*Lady Bruce*" and observed three other outward bound vessels to anchor. The wind being light and tide setting into the reef 6.20 P. M. I anchored, double reefed my topsails and got all ready

for heavy weather, the surrounding vessels bore as follows: "*Torch*" Floating Light Vessel East $\frac{1}{2}$ S. distant three miles; "*Nussur*" at anchor, N. W. four miles; "*Faizle Curreem*" ditto, N. by W. five miles; "*Samarang*" ditto, N. N. W. seven to eight miles.

At this time a dense bank of dark threatening clouds had collected to the S. W. with frequent flashes of lightning; between 10 and 11 P. M. the wind shifted to the Southward, when I weighed and put my vessel in a position to meet the outward bound vessels. I had scarcely secured my anchor when this threatening appearance burst upon us in all its fury, and the sea rose in the most unparalleled manner I ever witnessed. As a swell before, it was high; but it now turned into perfect breakers, my anxiety for the ships to the Northward became great, for I knew their anchors would never hold them in such weather, and without they could get to sea their position would be highly dangerous. I could be of no assistance to them, as no boat would live in the sea then running, I consequently proceeded to the Southward under foretopmast staysail and foresail, being as much sail as the vessel could carry; at midnight I suddenly lost sight of the Floating Light's lanthorn. 16th, from midnight to 3 A. M. it blew a gale of wind, and then commenced to moderate, set the double-reefed main topsail keeping the yard on the cap. The *Megna* shipped one or two rather heavy seas, but sustained no damage or loss in any thing; 5.30 A. M. I wore round and stood back in a track to meet the vessels coming out; at 7.30 A. M. took Mr. Keymer, Master, out of the Emigrant ship "*Faizle Curreem*;" Noon took Mr. W. Jackson, Master, out of the barque "*Samarang*." The *Nussur* was now the only missing Vessel, and we were anxiously looking for her; at 0.30 P. M. sighted a vessel to the N. N. West with a Jack up, also the Floating Light in the same direction; at 1.20 P. M. bore away to close with the stranger; at 1.30 P. M. the report was given of men being seen floating in the water, the next instant we found ourselves among a mass of wreck such as spars, hencoops, chests, doors, &c. &c. also men in all directions, evidently showing that some fatal accident had occurred. The vessel was hove to instantly, and I am happy to say, under Providence, we were instrumental in saving eleven men. My mate Mr. W. E. Revett was very active in the boat, and states that he took one man off Mr.

Spences' cot; that his chest with name on was alongside him, but as life was at stake, he did not stop to pick them up. I much fear we did not save all that were about us, for blowing hard as it was even then, the vessel drifted so fast to leeward that we lost sight of the things, and the "*Alexander Baring*" being close to me requiring a Pilot I went to her and put the saved men on board. Before I could work to windward again to the wreck, a second vessel met me requiring a Pilot; after supplying her it was dusk, and we had lost all traces of the wreck now. I continued working to windward all night.

17th. At daylight I again stood down to the S. East and fortunately met parts of the same wreck again, but I am sorry to say no survivors on it. We also saw one of the Quarter Boats, stove, returning in again to the N. W. examining every speck we saw, when about eight miles from the Light Vessel she then bearing about N. West, we fell in with two top-gallant masts standing almost upright in the water and evidently fast by something at the bottom by the tide running past them. I ran close to one and passed a four inch rope over it endeavouring to disengage one of them, but the rope parted. This wreck lay in twenty fathoms water. Floating Light bearing about N. E. by E. distance seven miles. I cannot give you any further account of how the "*Nussur*" met her fate beyond what I did in my first letter. I have since been on board the "*Torch*" Floating Light Vessel to ascertain whether they received any damage, or had seen any thing of the wreck. Mr. Bunn states that about midnight of the 15th they saw a Barque under small sail close to him and hoisted the peak light for him; at this instant the "*Torch*" was struck by one of those tremendous rollers, and the hatch being off (they were veering away cable) the vessel was near foundering from the immense quantity of water that got below, he states five feet being in her at one time, and that had a second sea followed she must have foundered. The crew were all panic-stricken and floating about the decks, also the hatches which were lost for a time; on recovering from their fright they looked for the Barque, but nothing could be seen of her. The "*Torch*" has not sustained any loss or damage.

1848.	Ship's Barometer, by Troughton and Simms.				Mean of Thermo- meter.	Barometer and weather from 1st to 18th July by Mr. B. Pilot S. Ransom, Commanding Megna P. V.
	4 A. M.	10 A. M.	4 P. M.	10 P. M.		
July,						
8th ..	..	29.92	29.85	30.00	86.0	Pleasant southerly breezes and fine; P. M. squally from N. W.
9th ..	29.80	.92	.83	29.84	83.0	Heavy rain and squally from S. S. W.
10th ..	.96	.92	.91	..	84.30	Ditto ditto from South; latter moderate and fine.
11th ..	.96	.96	.94	.90	84.0	Ditto ditto
12th ..	.96	.92	.82	.97	85.0	Light S. S. W. breezes and fine weather, sea smooth.
13th .	.82	.86	.75	.83	85.30	Ditto S. S. E. and fine.
14th ..	.86	.80	.64	.73	85.0	First part light Easterly airs; middle and latter increasing from East and squally.
15th ..	.66	.66	.57	.56	84.0	Throughout squally with rain, wind very uncertain, going from East to North, with a high South- erly sea; 6 P. M. calm, dense bank of clouds to S. W.; 11 P. M. hard gale at W. S. W.
16th ..	.53	.66	.68	.76	84.0	First part hard gale with most tremendous sea, 4 A. M. moderat- ing at W. S. W.; latter moderate, little or no rain or lightning during this gale.
17th ..	.65	.71	.62	.68	83.30	Moderate breezes W. S. W. to West; middle and latter high sea, dark rainy weather.
18th ..	.65	.70	.60	.63	83.0	Ditto winds S. E. to West; squally and rainy throughout.

Abridged Reports of Mr. Branch Pilot B. HERITAGE, and R. HAND, Master Pilot, W. JACKSON, and Mate Pilot R. REAN, to Captain H. L. THOMAS, Master Attendant.

No. 1.

I have the honour to inform you that last evening I came to an anchor in a calm in twenty fathoms South Channel at 10-30 P. M. suddenly a strong breeze came from S. E. veered away cable to one hundred and twenty fathoms, to ease the vessel that I might keep my station, but the wind increasing to a strong gale from South, drawing to the westward with a heavy sea; the vessel labouring much, began to drive and shoaled into fourteen and half fathoms.

I deemed it prudent to cut for the preservation of the vessel and those on board and put to sea under close-reefed topsails. Sandheads, *Flame P. V.*, July 17th, 1848.

B. HERITAGE,

B. P.

No. 2.

I have the honour in reply to your letter No. 1664 of the 9th instant, to give the following statement of the weather on the night of the 16th instant.

The first of it commenced about 10 P. M. with a heavy squall from the W. S. W. which lasted till 11 P. M. when it gradually decreased into passing squalls, but very heavy for the time they lasted, which was until 1 A. M. when the weather became moderated, and set in with a fresh W. S. W. to S. W. breeze. There was a heavy sea on during the squalls which occasioned the "Colleroon" though light, to pitch her jib-boom under, and once or twice the end of her main-boom.

Having the Light Station, I considered it my duty for the safety of shipping coming into the port to keep my position as long as I could with safety to the vessel and lives on board, consequently I gave her one hundred and eighty fathoms of cable and rode it out.

R. HAND,

B. P.

No. 3.

I beg to say that I left Saugor Point at 10 A. M., on that day with the Barque *Samarang* under my pilotage charge, the wind was

at North a moderate royal breeze. Towards noon it fell light and went round to E. N. E. falling almost a calm, the sea in the channel was nothing to speak of during the day at 5-30 P. M. I anchored in quarter less seven fathoms with sixty fathoms of cable in the following position, the Reef Buoy bearing S. by W. distance about four miles, the Barque *Nussar* was South a little below the buoy, the *Faizel Curreem* S. S. E. about the same distance, a moderate breeze sprang up after sun-set from E. S. E. and went round to the southward by 10 P. M. About midnight I was called and found the weather to have a very threatening appearance, to the S. W. the squall came on with such force that I thought the little vessel was going to be blown out of the water altogether, the channel became one heap of breakers, at the same time, my first desire was to slip, but Captain Pollock not liking the idea of loosing the sixty fathoms of chain requested me to remain until daylight; fortunately the little vessel was light and rode without shipping a single sea, it being an ebb-tide, the wind from West to W. S. W. being a-beam, so that we rode without requiring to give her more cable, the only dread we had was of a roller breaking on board of us, which I am happy to say did not occur. At 3-30 A. M. the wind moderated and the sea was not so violent at 7 A. M. on the morning of the 16th with a light air from W. N. W.

W. JACKSON,
Master.

No. 4.

I have the honour to inform you, that I received your letter No. 1669 of the 9th instant yesterday, directing me to furnish for the information of the Superintendent of Marine, a statement of the weather and our proceedings on board during the night of Saturday the 15th ultimo.

In reply I beg to state that we experienced no gale of wind on the night mentioned, we were riding with seventy fathoms of cable, in consequence of the heavy swell then running in the channel. I have enclosed an abstract of the log for the 15th and 16th ult.

(Signed) C. R. REAN.
Mate in Charge.

GASPER CHANNEL.

An Abstract of the Log of the H. C. F. L. Vessel "Hope," for the 15th and 16th of July, 1848.

Date.	Winds and Weather.	Remarks.
Saturday July 15th, 1848. Barometer 29.40.	A. M. moderate N. N. E. wind and clear weather. 4 A. M. ditto winds and cloudy weather. 8 A. M. ditto winds and weather. Noon fresh northwardly winds and cloudy weather. 4 P. M. ditto winds and cloudy squally weather. 8 P. M. moderated eastwardly winds and cloudy weather. Midnight moderate N. N. E. winds and cloudy weather.	Daylight moderate N. N. E. winds and cloudy weather with a heavy swell. Sun-set fresh N. E. winds and cloudy weather with a heavy swell.
Sunday, July 16th, 1848. Barometer 29.55.	A. M. moderate N. N. E. winds and cloudy weather. 4 A. M. ditto winds and weather. 8 A. M. fresh N. W. wind and squally with showers of rain. Noon fresh W. S. W. winds and cloudy weather. 4 P. M. ditto winds and weather. 8 P. M. fresh S. W. by S. winds and cloudy squally weather. Midnight fresh S. W. winds and cloudy weather.	Daylight fresh northwardly winds and cloudy weather with a heavy swell. Sun-set fresh S. W. by S. winds and cloudy squally weather with a heavy swell. (Signed) F. DUNCAN, <i>Acting Mate.</i> (Signed) C. R. REAN, <i>Mate in Charge.</i>

SHIP FYZUL CURREEM.

Memorandum of a gale of wind experienced on board the ship "FYZUL CURREEM," Captain BALLANTYNE, from the report of Mr. Master Pilot J. KEYMER, Saturday, July 15th, 1848.

Daylight weighed in tow of the steamer *Dwarkanath*, fine weather, wind steady and moderate from N. N. E. 6 A. M. set sail, carried four and half fathoms across Auckland Ridge. 7-30 A. M., 9-45 A. M. The ebb-tide made with us off the lower buoys of Lloyd's Channel. 10-45 A. M., wind increasing from North, but weather clear and fine, noon increasing breeze veering round to N. E., Barometer 29.48, 30 P. M. cast off the steamer Reef Buoy W. S. W. lower Floating Light S. S. E. 5-30 P. M. wind falling nearly a calm, and, finding we were losing ground, brought up in eight fathoms water with the larboard bower anchor, with sixty fathoms cable with the following bearings.

Reef Buoy,..... S. W. by W. $\frac{1}{2}$ W.

Lower Floating Light vessel, S. S. E.

Megna buoy station ditto, South.

Bark "*Nussur*" at an anchor S. W. by W., *Samarang* (do.) N. N. W.

Reefed topsails and furled sails, 8-30 P. M. light E. N. E. breeze, commenced weighing, but finding it impossible to weigh during the night, the crew being much exhausted and the wind being light from the Eastward, veered out chain again to sixty fathoms, intending to remain till daylight.

11-30 P. M. The wind veered round to the S. W. The sky assumed a very threatening appearance to the Westward and the Barometer falling; midnight increasing breeze from the S. Westward with a fearful cross sea, the vessel rolling and labouring very much, had the greatest difficulty in keeping the coolies below.

Sunday, 16th July, 1848.—About 1 A. M. blowing a fearful gale from S. W. b. W. which came up very suddenly and striking the vessel astern, forged her ahead till the cable was taught, when she parted two stoppers that were on abaft the bits; ran out all the cable on deck, and shortly afterwards parted, the helm was immediately put hard over to port and the vessel wore round with her head to the Southward, the yards braced round on the starboard tack, but owing to the quantity of cable that was out, the ship was quite unmanageable, and drifted to the E. N. Eastward, unfortunately at this moment of peril, few of the crew could be found, the greater

part of the lascars having ran below and otherwise from fear and exhaustion secreted themselves about the vessel, the rest of the crew being unwilling or unable from fear to go aloft, the 2nd officer I believe, and the Serang went aloft and loosed the foresail, the remaining few on deck trying to slip the cable at the seventy-five fathoms shackle. 1-45 A. M. After a very severe and hard task succeeded in setting the foresail, but were obliged to take the tack and sheet to the capstan after it was set, the vessel was still very unmanageable, drifting fast to the Eastward and labouring much, owing to the quantity of cable that was out bringing her up in the wind; found all attempts to start the bolt of the seventy-five fathoms impossible; brought to the messenger and hove in a few links till the sixty fathoms shackle was inside the hawse, after an hour and a half hard work. 2-30 A. M. succeeded in slipping the cable at sixty fathoms. Whilst we were busily engaged on deck unshackling the cable, Mr. McGregor, the chief officer went aloft, and succeeded in loosing the main sail and main topsail. 3 A. M. The wind veered to W. and W. N. W., but more moderate; Barometer 29.11. succeeded in getting aft the main sheet, but not till it was taken to the capstan. We were also obliged to take the topsail sheets and halliards to the capstan, otherwise our exhausted crew could not have set them. 5 A. M. Wind still moderating, set double-reefed fore-topsail, single-reefed main and close-reefed mizen topsails and mizen. Barometer 29.14, wind at this time again veered to the S. W. with the same threatening appearance in the weather. 5-50 A. M. Being out of Pilot's water, Pilot gave over charge to Capt. Ballantyne, requesting him to stand to sea till the weather moderated and protested against his returning, till he had another anchor ready, and his crew were in a more efficient and able state. 6 A. M. sighted the *Megna* buoy station vessel to the S. E. made the signal to be taken out. 7 A. M. I was taken out by her.

The *Fyzul Curreem* made no water throughout the gale, although she shipped an immense quantity of it down the hatches which at times so intimidated the coolies, that they attempted to force their way on deck, but this they were prevented from doing after very strong remonstrance. Had they reached the deck the confusion which they were likely to make, would beyond a doubt have proved fatal to many, if not to us all.

(Signed)

J. KEYMER,
Master Pilot.

Log of the H. C. F. L. Vessel "Torch."

Date.	Winds and Weather.	Vessels in sight.	Remarks.
Saturday, July 15, 1848.	Brisk N. N. E. and cloudy with rain at A. M.	Day light H. C. P. V. "Megna" at anchor W. N. W.	Day light passing heavy squalls from N. E. to E. with showers of rain.
29.53 Th. 83	4 A. M. ditto variable and ditto.	Sunset H. C. P. V. "Megna" at anchor W. by N.	At 11.40 P. M. Breeze increasing at S. W. attended with squalls and light rain, likewise observed the vessel take a sheer with her head to the westward; found the lead edging ahead of the vessel, fast at the same time, being half ebb-tide, being dubious of the vessel driving immediately, let go the Larbd. Bower anchor and commenced veering out cable; breeze increasing to a strong gale and very threatening appearances all round, with a tremendous heavy confused sea on, the sea making a complete break fore and aft. Shewed usual lights for the outer station and hoisted the lantern half mast-head.
29.58 Th. 84	Noon ditto ditto.		
29.46 Th. 84	4 P. M. ditto ditto with distt. thunder.		
29.36 Th. 84	8 P. M. light East and cloudy with lightning.		
Sunday, July 16, 1848.	Midnight strong gale at S. W. with threatening appearances all round and light rain.	Day light nothing in sight.	0.20 A. M. observed a Barque on our Starboard Quarter standing to the Southward, immediately hoisted the Gaff end light. At 0.30 A. M. vessel shipped

a tremendous heavy sea clean over the bows, and filled the decks fore and aft nearly up to the upper rail. At the same time had the main hatches open, giving the vessel more cable, the vessel rolling and pitching very heavy, a great quantity of water went down the main hatch, about 2 feet of water in the between decks and about 4 feet in the hold, commencing baling water out of the between decks and pumping out, at the same time trimming the mast-head Lantern, washed all the lamps on the deck, hen-coops, hatches, &c. adrift on the deck secured the same and after veering out cables, battened down the main hatches, and made all snug; quarter gallery much damaged, the head boards rail and figure head much injured. 4.30 A. M. Veered cable on the starboard anchor 150 fms. and on the larboard with much difficulty 100 fms. 8 A. M. weather clearing up observed the outer Floating Light Buoy, bearing as before North, distant about $1\frac{1}{2}$ miles. 10.30 A. M. observed a bright spar, with black mast-head, also a chest apparently lashed to it drifting to the Southward with two men on it. 3 P. M. commenced heaving in the larboard cable, vessel riding with the Southward anchor 150 fms. cable, first 12 hours of this day, heavy confused sea on, shipping a great quantity of water and the sea striking under the boats' bottoms.

4 A. M. ditto W. S. W. and ditto.
8 A. M. sighted a harque to the S. E.

29.61 Th. 82
8 A. M. breeze moderating at W. S. W. and weather clearing up.
1.40 P. M. ditto H. C. P. V. "Magna" South.

29.61 Th. 84
Noon brisk ditto and cloudy.

4 P. M. ditto ditto.

29.61 Th. 84
8 P. M. ditto S. W. by S. and clear midnight ditto West and ditto.

Log of the H. C. F. L. Vessel "Torch"—(Continued.)

Date.	Winds and Weather.	Vessels in sight.	Remarks.
Monday, July 17, 1848.	A. M. brisk West, and clear. 4 A. M. ditto ditto.	.....	Day light brisk W. breezes and cloudy with constant showers of rain.
29.57 Th. 82	8 A. M. moderate ditto and cloudy.	.....	Sunset light South breezes and cloudy weather.
29.57 Th. 82	Noon passing squalls with showers of rain from W. to N. N. W.	.....	7 P. M. hove in cable to 70 fathoms.
29.57 Th. 82	4 P. M. light S. W. and cloudy. 8 P. M. ditto South and ditto midnight strong W. S. W. and ditto.	.....	8 30 P. M. N. W. with showers of rain.

H. C. F. L. V. *Torch*, *Kedjeree*,
The 27th July, 1848. }

J. BUNER,
Commander.

I have called this terrific burst of wind a Tornado, more because of its force and limited extent than from any evidence of its being a *turning* gale at all, like the preceding one, but from its having upset one ship and placed others in imminent danger, it evidently approximated closely to the African Tornos and the *Pamperos* of the Rio de la Plata, and is thus part of the meteorological history of our dangerous Sand Heads. We have no reports from any vessel intermediately placed between the Reef Buoy and the Upper Floating Light (a distance of fourteen miles) where no gale was experienced, it is therefore quite possible that there may have been Easterly and N. Easterly gales, at all events during the first burst of the Tornado in this distance. The fall of the Barometer, as shewn by Mr. Ransom's careful table, and the dismal appearance described, were, however, ample warning to make all preparations for bad weather, especially in a position so fraught with danger.

III.

CHITTAGONG CYCLONE OF MAY 1849.

In the month of May 1849, the station of Chittagong was visited by a very severe Cyclone, though of small extent, which not only committed great ravages there and on the trading craft in the river, but seems also, and this gives it to us a very high degree of interest, to have passed very slowly over the station, and to have occasioned a very remarkable depression of the Barometer.

I watched this Cyclone with much interest, for its bank of clouds was clearly visible from the terrace of my house in Calcutta for at least two days, and I spared no pains to obtain all the details I could possibly collect by forwarding series of questions to official persons and residents. I have been greatly obliged by the kind attention of those gentlemen who have returned replies to them, I first print the official report of the Master Attendant Capt. Elson who is also Assistant Collector of Customs, abridged in such parts as are unessential to our researches, I have also put in *Italics* some passages which are very remarkable.

TO R. TORRENS, *Esq.*, Commissioner 16th Division, Chittagong.

SIR,—I have the honor to report for your information the circumstances connected with the late hurricane which occurred on the night of Saturday and Sunday morning last the 12th and 13th May, (1849.)

2nd. I premise by saying that during a residence of twenty years in Chittagong, I have seen nothing approaching to it in severity, nor have older residents than myself seen any thing at all to be compared with it since the awful and destructive hurricane of 1824, which deluged the adjoining Islands and the low parts of the district and caused an immense loss of life and property.

3rd. On the 11th, it began to rain steadily, and occasionally it rained heavily, the wind veering from the S. E. to S., the Barometer standing at 29.73; Thermometer at 79° in the shade. There was no indication, however, of any thing more than the setting in of the periodical rains, the usual time for which had passed.* On the 12th, the clouds were heavy but nothing indicative of any remarkable change. The Barometer had fallen to 29.62½ and Thermometer stood at 80° in the shade. The rain was light and drizzling and at noon, the breezes were moderate from South to S. E. and cloudy weather; at 9 P. M. a strong breeze was succeeded by a severe hurricane with heavy rain, blowing and beating with intense and unabating fury. It commenced at N. W. veered round by the North and N. E. b. East then S. and S. W. and N., again *this species of whirlwind was repeated several times between 9 P. M. on the night of the 12th to 3 A. M. on the morning of the 13th, and did not finally subside till day light of the latter day.* The Barometer† took a range during the hurricane of *one and a half inch, but it did not indicate its approach, nor did it fall to any degree noticeable till the hurricane had actually taken us.* It is worthy of notice that during this hurricane *we had not one clap of thunder nor one flash of lightning* but some parties in the station felt the shock of an earthquake, while others thought they saw phosphoric lights emitted from the ground upwards.‡ On the afternoon and night of this day the 13th, there was heavy rain, the country was deluged with water and strewed

* The weather during the whole of this season having been unsettled with frequent rain, rendered it unlikely that any extraordinary gale should happen at the setting in of the monsoon.

† It fell altogether from 29.62½ to 28.40 its lowest figure during the gale and the hurricane appears to have embraced a portion of the country of about fifty miles in diameter taking the town of Chittagong as its centre.

‡ This report was made previous to my queries being circulated at the station.—H. P.

with wrecks of trees and houses, the most awful thunder and lightning that has been heard for years accompanied this rain, but not much wind. On the morning of the 14th, the same weather continued. The Barometer had risen to 29.62. In the afternoon of the 14th, the weather was fair but cloudy. The Barometer standing at 29.57, still a low figure. On the 16th, Barometer 29.60. Thermometer 83°. Fresh breezes from the South and fair weather.

4th. Having now endeavoured to give you a detailed account of this severe hurricane, I will attempt to relate as far as I have ascertained the damage done to the shipping and the Port generally. The temporary flag-staff has been blown down, one Row boat was blown on shore but no damage of importance done. The Port Master's Schooner "Cygnet" has foundered at her anchors, and one man is lost. When I visited the wreck, I found a large raft of timber foul of it, what share this had in sending her to the bottom, I cannot say; the people on board of the Schooner appear to have been so desperately affrighted, that they can give no account of themselves nor of any thing else. Intercourse with the shore was perfectly out of the question. For the reasons stated in my separate letter I fear the Schooner is irrecoverably lost.

5th. The buoys at the river's mouth have withstood the gale.

6th. The Pier at the ghat has been nearly destroyed partly by vessels running against it, and partly by the force of the wind and sea; a portion of it is standing in the river, separated from the main road, the intermediate space having given way. A great part of the revetment erected for the protection of the salt golahs has been destroyed and the salt golahs themselves exhibit a sorry spectacle of what they have suffered. The losses in this department are currently estimated by lacks, not in thousands of rupees. The shipping community have suffered most severely, 22 vessels have sunk at their anchors and 44 vessels have been cast on the shore, many of them so severely damaged, as to render their recovery useless even when recoverable. On the whole there never has been perhaps such a fatal season to the shipping at this Port, and whether I look at the shipping or the shore, the ravages of the desolating elements are alike every where apparent.

7th. This I feel to be a very inadequate description of the mis-

chief and distress occasioned by the late storm, and I much fear that a great deal remains still to be told. I have no account as yet from the Light House.

8th. I annex a statement of the casualties in vessels as far as I have yet ascertained.

Sd. F. J. A. ELSON,

Port Master and Asstt. Collector of Sea Customs.

Port Office, Chittagong, the 17th May, 1849.

The following are the replies to my queries, the query being in Italics and the Antique letters **E.** &c. standing for the names of the following gentlemen, viz.

E. F. J. A. Elson, Esq.

J. R. B. J. R. Bedford, Esq. M. D.

B. O. T. Buckland, Esq. C. S.

M. J. Maxwell, Esq.

T. R. Trotter, Esq. C. S.

R. I. Robt. Ince, Esq. Salt Dept.

QUERY—No. 1.

Please to state how the wind began to blow, how it continued to blow and veer, and how it ended, as near as you recollect.

Elson. See his report above for this reply.

J. R. Bedford, Buckland. On the 12th May the sun set in a stormy sky. The wind blew freshly all the evening and became a decided gale; at 11 P. M. blowing from N. N. E.; at 12 P. M. it came due East and at 2 A. M. S. E. this was the height of the hurricane. It now slightly abating veered round the South and subsequently to S. W. finally blowing itself out in gusts from N. W. at 4 A. M.

Maxwell. I agree to what Dr. Bedford has said except about the setting of the sun, I do not think it had been seen for two days, and I do not recollect any stormy appearance in the sky. We had had much rain on the 11th and 12th.

Trotter. About North; it veered Easterly and ended about S. E. Southerly.

N. B.—Notes to this from Mr. Ince and Mr. J. Maxwell intimate that they think Mr. Trotter has mistaken the direction of the wind.

No. 2.

When was it at the highest, and how long did the extreme fury of it last?

E. At 2.30 A. M. it was at its height, but several houses had been unroofed prior to that hour.

J. R. B. It was at the highest at from 2 to 3 A. M. the extreme fury lasting about one hour.

B. My house suffered most before 2 A. M.

M. At its highest from 12.30 to 2.30 it blew furiously the whole time.

No. 3.

Did it veer oftener than once while it was heaviest, or was it steady then at one point?

E. It struck me that the wind veered right round more than once, and was never steady except at the S. E. point, from which it always blew with great fury.

J. R. B. During the height of the hurricane, it appeared to veer slowly and steadily from S. E. to South.

M. It blew from the East for one hour and then veered partially.

No. 4.

Were the changes veerings or shiftings, that is, gradual or sudden?

E. I think in some cases sudden, but not from one point to its directly opposite point at once.

J. R. B. Veering I believe throughout.

B. Gradual. **M.** Gradual.

No. 5.

Was there any interval of calm when at the highest?

E. None. **M.** No.

J. R. B. I believe not.

B. One native report sent to me from Raojun* mentioned that the storm ceased for about half an hour there soon after midnight, and then began again; but the writer of this report was not at Raojun during the storm; he heard this from the members of his family there when he went to see them a few days afterwards.

* Thirteen miles N. 42° East from the station of Chittagong by the Revenue Survey map, as reduced for Rushton's Directory.

No. 6.

Was there any lightning that you observed, and at what periods of the hurricane?

E. Not a flash or clap of thunder but rain in torrents.

J. R. B. I looked out repeatedly during the gales and saw no lightning. There was a distant rumbling of thunder about 4 A. M. of the 13th.

M. No. I was on the look out the whole time.

No. 7.

Was there any kind of remarkable light like that of phosphorus, or an oiled paper screen?

E. There were two persons in the station, on a hill in the neighbourhood, who thought they saw phosphoric lights glancing or playing about the ground.

B. It was not easy to look out on account of the dirt from the broken verandahs and rubbish that was driving about, but I saw no light except that of the moon which though invisible itself, cast a faint light on the driving clouds.

M. Yes: The sky had a decidedly luminous appearance much more than could be expected to arise from the moon at its last quarter.

No. 8.

Did you see or hear of any one who saw flashes or streams of lightning proceeding upwards from the earth to the clouds?

E. See reply to No. 7.

J. R. B. The Rev. Mr. Johannes and his son-in-law Mr. Roberts of the Abkarry Department assert that they saw fire streaming along the surface of a closely neighbouring hill on two or three occasions during the night.

B. There was a large Bolam boat burnt during the storm close to Mr. Johannes' house.

M. I saw nothing of the burning of boats or houses.

R. I. Nothing of this kind that I saw; the night was *strangely* bright. I could perceive almost every object outside: perhaps the most extraordinary feature in this storm was, that we had neither thunder nor lightning.

No. 9.

Were any fire-balls or sparks noticed?

E. None that I saw or heard of.

M. None except from the boats and houses referred to.

No. 10.

Was there any thing which appear like flashes or gleams of light in the vacuum of the tube of the Barometer noticed?

E. I think not. I had my barometer before me all the time. I took it down at first, as I thought my house was coming down, and on putting it up was surprised to find it had fallen to such a low figure and was still falling.

No other replies are given to this query.

No. 11.

What do you take to have been the greatest rise of the river above low water mark, and at what time did it reach this?

E. The moon on the 12th was 28 days old nearly, and consequently it was a neap-tide: Indeed almost the lowest tide. Yet my row-boat was blown up so high on shore, that I could not find her off without digging her out, even on the next highest spring-tide; I should say the rise of water was at least 18 feet. Fifteen feet is the ordinary rise of high spring-tide here.

M. I should say 18 or 20 feet.

R. I. Not less, I should be disposed to think. Such was the force of the storm, that at the Sudder Ghat a vessel of 4,500 maunds (150 tons) was thrown nearly on the road.

No. 12.

Was the rise a gradual or a sudden one, and did any wave or bore come in when the sudden rise took place?

No replies.

No. 13.

Please to add any other remarks or details which may occur to you. Say such as indicate the great force of the wind or the like.

E. The force of the wind was equal to any hurricane I ever saw at sea off the Mauritius. It blew down the spire of the church, the balustrades of houses and trees of all kinds, and left the town in a fearful state of desolation. All the fallen trees, at least the large trees, lie in a S. E. and N. W. line, their heads to the N. W. plainly indicating the quarter from which the severity of the hur-

ricane came. An open Tonjohn* was blown out of my verandah with a man in it and another trying to hold it; in fact a man could not keep his legs at one time. Iron staples were drawn and glass doors forced in. All my out offices were unroofed, and so were those nearly of every body else. The river and its banks were strewn with 66 wrecks whole or partial; *all square-rigged vessels.*

Register of Barometer.

<i>Before.</i>	<i>After.</i>
May 10th—29.80	May 13th—29.62
„ 11th—29.73	„ 14th—29.66
„ 12th—29.66	„ 15th—29.60
During the gale,	
	<i>Bar.</i>
May 13th—1.30 A. M.	28.77
„ 2.30 „	28.44
„ 2.45 „	28.40
„ 2.50 „	28.48
„ 2.55 „	28.60
„ 2.60 „	28.67
„ 3.30 „	28.90
„ 3.35 „	29.06
„ 4.0 „	29.20
„ 4.30 „	29.26
„ 5. „	29.46
„ 10. „	29.62

The lowest figure of the Barometer indicates the most severe period of the hurricane, as it happened to us: the gale was severe for seven hours, viz. from 9 P. M. of the 12th to 4 A. M. of the 13th.

J. R. B. See the observations of Captain Elson for the Bar.

M. The force of the wind was so great, that a servant of mine was blown over in endeavouring to reach my cook-room.

B. The fallen trees lay chiefly pointing from S. E. to N. W. thus indicating the point at which the wind was most violent.

No. 14.

Did you or any person to your knowledge experience any shock of an earthquake, and at what time?

E. I experienced no shock of an earthquake, and should say that in such a turmoil of noise, confusion, and wreck, and storm, it would

* Tonjohn, an open or close sedan chair.

require a very nice observer to recognise the shock of an earthquake, unless very severe; but Capt. Maxwell says he felt one. I fully expected my house to come down, as there was one next to me roofless and the tenant, Lieut. Hutchison, his wife and child in a stable, and they could not even walk over to my house, not fifty yards across.

J. R. B. One or two residents in the station imagined they felt an earthquake; but I was awake during the whole night and was conscious of nothing of the kind.

M. At 5 minutes to 2 A. M. I distinctly felt an earthquake, and so did Mr. Maxwell: I cannot be mistaken.

R. T. I felt something like it about that time, as the doors and even the walls appeared to shake.

The following are abridgments of newspaper accounts which appeared shortly after this Cyclone in the *Calcutta Englishman*.

The weather has been so very unusual here, that many persons supposed a hurricane had occurred at the Sandheads. Reports from that quarter, however, mentioned remarkably fine weather for the season, and we were beginning to think that all was well, when we found by the subjoined letter from a gentleman on whom we can fully rely, that the gale had visited another quarter, and it is to be feared that it has extended to the coast of Arracan:—

“ *Chittagong, Monday, 14th May.*

“On Saturday night Chittagong was visited by a tremendous storm or hurricane, of which I beg to give you the following account, in the hope that it may be interesting to you and your readers.

“During the evening of Saturday, the 12th instant, heavy rain fell, accompanied by strong wind, which increased in violence about 11 P. M., and from midnight to 3 A. M. on Sunday morning it blew a furious gale, with all the violence of one of Mr. Piddington’s Cyclones or a West India Hurricane.

“At first the wind came from the North-East, but it gradually worked round to the South, being most violent when about at South-East, and afterwards slowly diminishing its strength and fury as it came round to the North-West, at which point it gradually subsided into an ordinary breeze.

“Such a storm has not been known at Chittagong since the year 1824. Its effects have been terrible, and though Government is

perhaps the greatest loser, it must cause an immense amount of individual suffering, for I really cannot see a native house or shed in the town which has not been either thrown down or considerably damaged. There has not yet been time to ascertain the extent of damage done in the Mofussil. As far as I can make out from accounts yet received, the storm came down from the East, and went away towards the North, if this is not inconsistent with its having gone off when blowing from the North-West. I hear from the Magistrate, that every police station to the North and East of the town as far as the Feuny River has been utterly destroyed. The storm seems also to have extended, but with less violence, fifteen or twenty miles South of the Town; but I have not been able to obtain any accounts yet from places situated still further to the South, and hope that they have escaped.

“The pucka (brick) houses of the residents, which are all built on the tops of little hills, have suffered as might be expected from their exposed position. Most of them were once surrounded by thatched verandahs; but now not one can boast of a stick of verandah remaining. The walls seem to have stood in most of the pucka houses, but doors, windows, venetians, and even brick parapets have all been terribly damaged. Bungalows with their sloping roofs have suffered most, several have been quite unroofed, and some utterly thrown down. Stables and out-houses of all descriptions were overthrown, and in several, valuable horses were dug out from among the ruins; but luckily uninjured, through some wonderful good fortune. Three out of the four pinnacles adorning the Church tower were also blown down.

“But the greatest damage was done to the shipping in the river. The jetty at the Sudder ghât has been half broken down, and a great sloop now lies between it and the shore, with its masts stretching across the road. A few yards further down, there are seven sloops all driven against the bank together in one smash. One I saw, with the fiddle heads of two others broken off into its stern. A little further down, there is another party of four sloops driven ashore in similar ruin and confusion. Four other sloops have sunk in the middle of the river; and the Government schooner, the *Cygnnet*, went down at her anchorage, with one of her crew on board, her topmasts only being now visible.

“The fury of the wind broke up the thatched roofs of the Government Salt Golahs, and the rain which fell early on Sunday morning did considerable damage to the salt. But all last night and this morning it has rained again furiously, and I am told that the damage done to the salt is now estimated at about 5 (five) lakhs of rupees. The prisoners, and the few coolies that can be found, are now employed patching up the roofs, in case the rain should come on again.”

The following extract of a letter from Chittagong, is dated the 20th instant, and gives some further particulars of the late hurricane:—

“Since my last letter to you, I have been endeavouring to obtain more correct and accurate information, as to the course and extent of the hurricane, which visited Chittagong on the morning of the 13th instant.

“There are only native accounts to be procured of what happened in the Mofussil, but these are quite unanimous in the opinion that the storm came down from the East, and passed over to the South-West. I do not know whether these storms, when on land, are at all guided by the course of rivers, but this storm seems to have come down with its centre along the Kurnafoollah or Chittagong river, which flows towards the sea with a general direction from about ‘East by North’ to ‘West by South.’ It seems that the greatest violence of the storm was felt along the North bank of the river. It extended about twenty-five miles to the North of the Chittagong river and town; the peak of the Seetacoond Hill being its Northern limit. But to the South of the river it was not so violent, although it was felt as far as Sathanya, or full thirty miles from the town of Chittagong. This would give the storm a diameter of about fifty miles.

“I fully expect to hear that it has reached the Madras coast, for yesterday I saw the log of the Yacht *Mystery*, which was caught and dismasted in a hurricane at 3 A. M., on the 13th instant, in N. Lat. 17°, and E. Long. 88°.

“The *Mystery* was on her passage from Madras to Dacca, and put into this port in consequence of the damage sustained in the storm. The Captain told me that the wind seemed to blow from

all sides at once, but that it came on from the North-East, and gradually went off, blowing from the North-West. The time and the direction of the storm seem clearly to point out that this was the Chittagong storm, and at that rate of progress it may have reached Madras or Ceylon about 5 A. M.

“Several lives were lost here, by the falling of the native huts and trees. Three women and two children were killed in one hut, on which a huge tree fell. I have also heard of the deaths of seven men in different places, through injuries received during the storm. A sloop with 180 passengers from Akyab is said to have gone down at the mouth of the river, and only five people were saved.

“I have not been able to find out that any owner of a barometer observed any previous indication of the coming storm. The appearance of the sky did not foretell anything unusual.

“We have had heavy rain, with thunder, lightning, and sharp squalls of wind every day since the 13th, especially at night, to the great discomfort of the poor houseless natives. On the morning of the 14th seven inches of rain fell; and I should think ten inches a moderate computation for the remaining quantity that has fallen during the week. This rain has of course added to the injury done to the Company’s salt, for it was utterly impossible to repair the damage done by the hurricane to the thatch of the Golahs, so as to exclude it effectually. But I believe that the total damage sustained in the Salt Department is about four lakhs of Rupees instead of five as previously stated.”

The following is an official report by E. Lautour, Esq. C. S. Deputy Collector; from Bulloah Lat. $22^{\circ} 52' N.$; Long. $90^{\circ} 44' East$; sixty-eight miles N. and sixty-three W. from Chittagong.

“On the night of the 12th, we had moderate gale from E. N. E. to E. S. E.

2nd. Rain per guage at elevation of 4 feet 1.25.

Thermometer at day-light 78° .

Height of the gale 1 A. M. to 3 A. M.

3rd. There was every appearance of a heavy gale on the previous day, and it appears to have visited Chittagong with extreme violence on that night, and to have done very extensive mischief.

4th. With us however the gale was not more than moderate and

I conclude that Noacolly* may be considered the edge of the storm in this direction.”

I conclude the shore observations with the following which are my notes as taken at Calcutta, from which the station of Chittagong it will be recollected, bears S. 87° E. distance 210 miles.

Observations at Calcutta.

May 12th, 1849.—Barometer has been gradually falling; with Easterly and N. Easterly breezes *for the last two or three days*. In the morning dark nimbus and strato-nimbus to the East breaking and flying low and in detached portions across a blue sky with strata above. In the day, heavy white and bluish-gray cumuli with a dense white haze and strata above; very little blue sky. *At night stars very bright and seen at very low altitudes.*

On this day (12th) blowing fresh at Noon in squalls from N. E. with a very little drizzling rain.

$\frac{1}{2}$ past 6 P. M. Bar. 29.60; Simp. 29.64; Ther. $84\frac{1}{2}^{\circ}$.

Light breeze N. N. E. From the North to East, and round nearly to South, a dark heavy bank of strato-nimbus. To the Westward dark cumulo-strata below, and a blue sky with white strata above. At 8 P. M. calm. Bar. 29.59; Simp. 29.56; Ther. 84° .

May 13th.—6h. 15 A. M. Bar. 29.60; Simp. 29.65; Ther. $82\frac{1}{2}^{\circ}$. Calm. Thick bank to S. and S. East, clear to the East, dark strata and cirro-strata scattered about.

10h. 30 A. M. Bar. 29.59; Simp. 29.68; Ther. 84° . Calm. Light gauzy haze, and white loose cumuli. At $11\frac{1}{2}$ A. M. Bar. 29.62; Simp. 29.66; Ther. 84° . Calm. A broad white bank to the S. E. with numerous little strato-cumuli, gauzy fleecy haze and cumuli above. Light airs from the Westward. At $\frac{1}{2}$ past Noon Bar. 29.60; Simp. 29.65; Ther. 84° . At $6\frac{1}{4}$ P. M. Bar. 29.57; Simp. 29.62; Ther. $85\frac{1}{2}^{\circ}$.

May 14th.—Calm, oppressive night; Bar. 29.55; Simp. 29.66; Ther. $85\frac{1}{4}^{\circ}$. Light stationary white cumuli. To the S. East, light white and grey strata and hazy.

The following are the Barometer observations at the Surveyor General's Office for these days. Corrected, it will be observed, to 32° Faht. whereas all the others are without correction for Temperature.

* Noacolly, $5\frac{1}{2}$ miles to the N. East of the Collector's house.

Barometer and Thermometer as registered at the Surveyor General's Office, Calcutta. N. B. Bar. Corrd. to 32° Fahr.

Date.	Sunrise.		At 9h.50' A.M.		Appt. Noon.		At 2h.40' P.M.		At 4h. 0 P. M.		At Sunset.	
	Bar.	Ther.	Bar	Ther.	Bar.	Ther.	Bar.	Ther.	Bar.	Ther.	Bar.	Ther.
1849 May 11th,	29.651	77.3	29.773	86.7	29.689	89.3	29.588	91.1	29.564	90.6	29.599	87.0
12th,	.559	78.8	.588	83.7	.547	83.7	.487	86.7	.459	87.0	.478	85.6
13th,	.510	77.8	.564	88.6	.524	92.0	.440	94.7	.428	94.2	.451	91.7
14th,	.489	83.8	.532	93.0	.490	95.7	.404	97.8	.354	96.3	.488	86.0
15th,	.523	80.2	.562	89.6	.537	92.8	.475	93.9	.445	92.3	.479	88.3

Connected with the foregoing, and before giving the few sea logs in the Bay which I have been able to obtain, is the following capital account of the weather at the Sand Heads and between the South Channel and Kedgerree, for which I am obliged to Mr. Master Pilot F. Barlow of the H. C. P. V. *Salween*.

The *Salween's* Barometer from the 6th to the 9th May stood between 29.97 and 29.82 at 4 P. M. on the 9th May.

On the 10th May it was at 10 A. M. at 29.86; and at 4 P. M. at 29.79. Winds light E. S. E. to S. East and light rain at times. Mr. Barlow's observations commence regularly on the 11th, arranged nearly as in the following table, which is copied from the note-book, he was good enough to place at my disposal.

H. C. P. V. Salween, Friday, 11th May, 1849.

Date.	Hour.	Wind.	Force.	Clouds.	Seud from.	Swell from.	Clear sky visible.	Bar. A. Salween.	Bar. B.	Ther.	Remarks.
A. M.	1	..		..	..	..	..	..	..	..	A brilliant meteor to N. E. from 70° to 40°.
	2										
	3										
	4										
	5										
	6										
	7										
	8										
Noon.	9	E. b. S.	4	Cum : Strata Nimb.	East.	E. b. S	Patches every where.	29.78	..	..	Clouds most dense to N. N. E. and S. East.
	10	E. b. S.	3	Cirro-Cum : branching from S. to Zenith.	E. N. E.	Do. Do.	Do.	.83 .60	..	..
P. M.	11	East.	3	..	..	..	..	.80	..	..	Appearances much finer, many mares'-tails to S. East and S. W.
	12	..	3	..	..	..	..	.75	..	..
	1	E. b. N.	3	..	..	..	..	.70	..	..
	2	East.	3	..	..	..	..	.70	..	..
	3	E. b. S.	3	Cirri.	E. N. E.	..	..	.70	..	..
	4	to	3	..	..	..	..	.70	..	..
	5	Noon.	3	Cum : Strata	East.	E. S. E.	Mostly clear.	.70	..	..	A bank from E. S. E. to South. Stars very brilliant, seen as low as 2° or 3° of altitude!
	6	..	3	Clear to West and Cum :	..	..	..	.70	..	..	Stars not so brilliant as before.
	7	..	3	..	..	..	..	.72	..	..
	8	..	3	..	East.	..	..	.77	..	..	Dark banks East to South up to 60° lightning faint to N. E.
	9	..	3	..	..	..	..		..	..	Clouds, Cum : but most fantastic and changeable.
	10	..	3	..	..	..	..		..	..
	11	..	3	..	..	..	..		..	..
	12	..	3	..	..	..	..		..	..

II. C. P. V. Salween, Saturday, 12th May, 1849.

Date.	Hour.	Wind.	Force.	Clouds.	Seud from.	Swell from.	Clear sky visible.	Bar. A.	Bar. B.	Ther.	Remarks.
A. M.	1	East.						29.70			Cloudy. <i>Wind meaning very much "Sylph" in sight S. W. A few portions of horizon to Westward clear but dense strata from 5° to 30° of alt. Clouds piled in strata, current about 1 knot to Westward. A dense bank of dark blue (lead colour?) from E. N. E. to S. E.</i>
	2	E. b. N.						.66			
	3	N. E.						.66			
	4	—	5	Cum : nimb.	—	—	Zenith patches to Westd.				
	5	N. N. E.	—	—	N. E.	—	—				
	6	N. N. E.	—	—	N. N. E.	—	—				
	7	N.	6	Cum: a thick, liming all round most to E. & S. E.	—	—	—				
Noon.	8	N. $\frac{1}{2}$ W.	6	..	N.	—	Very little.	.66			10. Took charge of Sylph. Cirro-strata all round in a horse-shoe, but clear S. to S. b. E. Very heavy (clouds) ? rising and falling E. N. E. to S. clear to N. W. cum : strata overhead F. L. V. S. W. b. S. 6 miles in 8 $\frac{1}{2}$ fs. on East reef; heavy rain to E. S. E. Heavy rain squalls to S. E. rising to N. W. and expanding themselves. West. Reefed topsails, much light rain to N. E. East to S. E. Light showers finer. Very heavy rain to N. W. fitful wind. Squally app. to S. East S. and N. W. Hard strata, of clouds to N. N. E. Beautifully clear W. S. W. and N. W. nimb: and cum : strati to N. E. S. E. and South. Clear as if by magic from W. to N. and N. E.
	9	N. $\frac{1}{2}$ E.	7	..	N.	—	—	.65	29.53		
	10	N. b. W.	8	Cum : strata	—	—	—	.60	.50		
	11	N. $\frac{1}{2}$ W.	8	Heavy cum :	N.	—	—	.60	.50		
	12	North.	3	Do.	—	S. E.	None.				
P. M.	1	N. N. E.	7	Do.	—	—	—	.58	.48	86°	
	2	N. b. W.	7	Do.	N.	E. S. E. to South.	—	.55	.45	84	
	3	N. N. W.	5	Cum :	N.	East south.	—	.53	.43	84	
	4	N. N. W.	5	Do.	N.	S. E.	—	.54	.42	84	
	5	—	5	—	N. N. E.	Do.	—	.55	.42	84	
	6	N. b. E.	3	—	—	Do.	W. S. W. to	.55	.42	84	
	7	—	4	—	North.	do. light.	N. W.	.58	.47	84	

• B. Is a Bar. of the Clipper Sylph : another was found to correspond exactly with that of the Salween and so is continued in the same column, A, as the Salween's after 9 A. M. when Mr. Barlow took charge of the Sylph.

12th May—Continued.

8	N. N. W.	4	Cum:	—	None.	A few clouds N. E. to ze- nith.	.61	.48	84	Lightning S. W. cloudy to W. S. W. and N. W.
9	N. b. W.	4	Light cum:	None.	—	—	.61	.48	83	Ditto ditto hazy to N. fine weather.
10	—	3	—	—	—	—	.61	.48	83	Evidently a current setting to the Westward.
11	N. b. W. & N. b. E.	3	—	—	—	Zenith.	.62	.49	83	Lower floating light Vessel S. S. E. 5 miles.
12	—	—	..	..	..	—	.62	.51	83	Lightning S. E. to S. W. but sinking. Fine else- where.
1	W. N. W	2	to S. W.	N. W.	S. W.	All but S. E. to S. W.	—	—	—	Very fair to Northward but a slow scud from N. W. water smooth.
2	N. W. b. W. W.	2	Cum:-strati and nimb.	—	—	—	29.60	29.50	—	—
3	—	1	—	N. W. slow.	Southwd.	—	—	—	—	Cirro-cum: and Nimb: to S. W. and S. E. but fine everywhere else.
4	—	—	—	—	—	—	—	—	—	—
5	—	—	—	—	—	—	—	—	—	Heavy swell on Eastern reef but comparatively smooth in the channel.
6	—	—	—	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—	—	—
9	N. N. W.	1	Cirro-strati.	Noon.	S. S. E.	Zenith.	.65	.55	85°	Light strata to N. W. East and S. E.
10	—	—	—	—	—	—	—	—	—	Frightful breakers on Saugor Island and on Eastern reef at the Spit Buoy.
11	—	—	Cirro-strati to N. E.	—	—	—	.65	—	86	Calm; appearance of a breeze S. W.
12	—	—	—	—	S. S. E.	all.	.65	.55	—	Calm. Off upper floating light.
1	—	—	—	—	—	—	—	.50	—	—
2	—	—	—	—	—	—	—	—	—	—
3	S. W.	—	Clear.	—	—	all.	.65	.54	87	—

In Saugor Roads running for Kedgeree; fine and clear, but the usual S. W. monsoon haze.

We have no evidence that this Cyclone was at all felt at sea, for it was on the night of the 12th and 13th May that it visited Chittagong and its track was evidently from the N. 42° East to the S. 42° W. or out to sea; while the Brig *Colonel Burney* Capt. Crisp, whose note I shall add, was at the centre of a small Cyclone on the night of the 11th and 12th May at a distance of about 300 miles *to the S. W.* of Chittagong, so that if this little Cyclone had been the same which passed over Chittagong, it would have commenced there at South or S. E. and ended at N. W. or exactly contrary to the changes which took place there. The Calcutta newspaper letter, p. 25, mentions the dismasting of the Yacht *Mystery* in a Cyclone at 400 miles to the S. W. of Chittagong; at 3 A. M. of the 13th when the Cyclone was still raging at the station. Hence it is unnecessary to discuss whether it was the same. It was probably a small one of the same kind, but her Log has not reached me, I regret to say.

The ship *Sir Robert Seppings* had also on the 11th and 12th May while running up the Coast and abreast of Coringa, on the 12th some unsettled weather for which proper precautions were taken, but there is nothing in her log worth occupying our space.

The H. C. Surveying Brig *Krishna*, Lt. Fell, was also running up from off Cape Negrais on the 12th, to the light vessel on the 15th, but she carried a fresh monsoon, giving her from 5 to 7 and 8 knots the whole way, though with squally unsettled weather and her Barometer at 5 P. M., on the 14th at 29.59, when the remarks are as follows:

“Moderate breeze with a very hazy, damp sultry atmosphere; clouds very unsettled to the Westward, working to the Southward and again passing to the North *in circles*. At 11h. 20 P. M. wind suddenly shifted to the North with a short interval of calm then to the N. N. E. with a hard squall and rain.”

This occurred when the vessel was at about 225 miles to the S. W. b. W. of Chittagong and forty-three hours after the centre of the Chittagong Cyclone had passed over that station, so that if it was, *as it might have been*, for I do not pretend to say that *it was* so, the disk of that Cyclone which had lifted up and travelled onwards without descending, it had progressed at about five miles per hour, a slow rate, which however agrees well enough with its

almost stationary character at Chittagong. We have abundant proof that Cyclones descend; and some that they *ascend*, and are seen overhead after a certain progress at sea and on shore; but this amounts to but little more than a supposition, though it is not one to be omitted.

The following is the note of the "*Colonel Burney's*" log forwarded to me by Capt. Crisp, who unfortunately had no Barometer on board.

Extract from the "Colonel Burney's" Log.

May 11th, 1849.—In Latitude $17^{\circ} 51'$ N. and Long. $88^{\circ} 16'$ East; wind at E. S. E. with high sea from the Southward; at sunset, hard gales; hove to, with head to the Southward; at 11 P. M. wind suddenly shifted from East to North (yet the high sea running high from South); midnight shifted with a sudden gust to West, and blew with great violence until 3 A. M. of the 12th, when it shifted to S. W. and continued to blow in hard gales until 4 A. M. of the 13th, when the gale abated. Just before the gale abated, experienced very heavy peals of thunder attended with lightning and heavy rain; "at 8 A. M. strong breezes wind" shifted to North; at 2 P. M. wind shifted to S. W. steady breezes and sea subsiding.

The three days previous to the gale had nothing but calms, during which time we experienced a set to the Westward of fifteen miles per day, whereas during the gale we were set seventy miles to the Eastward.

Remarks.

It adds much interest to this remarkable Cyclone that it occurred at a spot like Chittagong, which is itself probably an extinct volcanic site, and situated at the extremity of the great volcanic band of the Pacific Ocean and Eastern Archipelago. The last severe earthquake on record there is that of April, 1762 (Philosophical Transactions, Vol. LIII. pp. 252 to 259) and it is added in the last of the accounts there given, that two volcanoes had "broken out." No gale seems to have accompanied this event.

I can find no newspaper record of the hurricane of 1824, alluded to in Capt. Elson's report, and in reply to a reference to that gentleman, he says:—

"On enquiry amongst the public offices, I find at the Salt Board a

letter of which Mr. Grote, C. S. the Secretary has obliged me with a copy, that on the 14th June a hurricane at South had been blowing for eight hours consecutively, but the report is not continued on the following days, or rather the documents have disappeared."

We are thus confined to the reports from Chittagong itself with regard to this singular Cyclone of 1849, and it will be I think convenient to divide our remarks under the following different heads.

1. Extent of the Cyclone.
2. Its track and rate of travelling.
3. Barometrical observations.
4. Other phenomena before, and during its continuance.

1.—*Extent of the Cyclone.*

It seems to have been pretty well ascertained at Chittagong that the diameter of the more violent and decided part of this Cyclone was not much above fifty miles in diameter, Sathaneah, thirty miles to the South of the station is given as the limit of where it was "*felt*" in that direction, and the same writer (see newspaper extract) states that he "heard from the Magistrate that every Police station as far North as the Fenny River* has been destroyed." The Police stations are generally stout, well-built bungalows, but not of brick but which take a heavy gale to destroy them, being moreover, usually, in sheltered situations. The Fenny River mouth is thirty-five miles N. N. W. from the station of Chittagong, and at Bulloah, sixty-eight miles to the N. W. b. W. we have European testimony that it was "not more than moderate" so that we may suppose, fairly, that the limit of the really violent part of the meteor did not exceed sixty miles, of which size I shall assume it to have been.

2.—*The Track and rate of travelling of the Cyclone.*

It is difficult to assign a track to this Cyclone as we usually do, for Captain Elson's account; and he is an old Sailor and most likely to be correct in his estimates of the direction of the wind would almost lead us to believe that the Cyclone *descended* upon or was formed at Chittagong, where it spent its fury, but the native report mentioned by Mr. Buckland (Replies to query No. 5) of an interval of calm, is I think entitled to full credit, because it was a circumstance

* The boundary of the district of Chittagong to the North.

which would much strike the terrified members of a native or even a European family, the head of which was absent while the house was blowing to pieces in a hurricane; and it is one which moreover they were not at all likely to have invented.

As *Raojan*, then, bears N. 42° East, distant thirteen miles from the station of Chittagong, we must in the absence of any better data take it that the Cyclone came down if not in this exact track, yet on one not far removed from it, and was slowly passing over Chittagong from 9 P. M. to daylight or say for 9 hours which for a diameter of sixty miles would give 6.6 miles *per* hour for its rate of travelling, and we have no reason to doubt, considering the gradual though excessive fall and subsequent rise of the Barometer, and the veering of the wind as in all cases of progressive Cyclones, that it *was* slowly passing. The great discrepancies in the opinions of the residents as to the direction of the wind, and even perhaps Capt. Elson's impression of its having gone round more than once, may I think be accounted for, partly by supposing that there were, especially in the severe gusts, excessive *incurvings* of the wind, and partly by considering that the station of Chittagong is described for the most part as a collection of bungalows and houses on small hills; and from the Revenue Survey map it appears to occupy a space of about a mile or a mile and a half in breadth, and about three miles in length from N. N. W. to S. S. E. on a sort of ridge of hills in that direction, so that a Cyclone crossing the station from the E. N. E. would do so at right angles; and thus the mere surface wind would be subjected from the nature of the ground alone, apart from its own incurvings, to infinite irregularities; and the whole occurring at night and the observers in houses apparently on the point of being blown to pieces, would render it next to impossible that we should have any other than discordant accounts of the actual direction of the wind.

3.—*The Barometrical Observations.*

These, though we have but one series of them, and this an imperfect one, are of very high importance, for they are a clear and distinct instance of a very great diminution of pressure occurring in a brief space of time, and over a very limited area.

4.—*Other Phenomena before and during the Cyclone.*

Of those before it.—The remarkable bank of clouds noticed both by myself and by Mr. Barlow at 200 miles distant, is the first of these. And supposing the Cyclone to have been travelling on a Westerly course, so as to pass the light vessel at the Sand Heads, watchful and careful commanders of ships would have had from this sign alone, some 24 hours of warning! and this would again have been corroborated by the remarkable twinkling of the stars, and their being seen so brightly at a very low altitude; an indication well known in the China Sea, and to which I have so frequently alluded. There was also at the Sand Heads as noticed by Mr. Barlow the *moaning* sound of the wind.

During the Cyclone.—The complete absence of thunder and lightning, as usual in these commotions, is another proof to the many we have of their electric nature, I think. That is to say: there is great electric action going on, but then the observers and every thing about them being enveloped in the electric disk and becoming conductors, do not feel it; and the transfer of electric fluid goes on till an equilibrium is established; but without discharges, because there is contact between the disk of the Cyclone and the earth.

The luminous appearance which so many of the observers so clearly testify to, is also a farther confirmation of this view,* for there seems no doubt it existed but the moon being then twenty days old and passing the meridian at about 4 A. M. on the 13th, may have had something to do with it, as supposed by some of the respondents to my queries. Nevertheless, the balance of evidence seems to be considerably in favour of the existence of moon light.†

As it may be possible that the Rev. gentleman who is stated to have seen the phosphoric lights (reply to query No. 8, p. 20) may have been deceived by some appearances arising from burning houses or boats. I think it unnecessary to remark upon them, though there is no doubt, that meteors of this kind have been seen in Cyclones in various parts of the world.

Altogether it will be seen that this Chittagong Cyclone is evidently

* See also Col. Reid's "Law of Storms," p. 74—76 for an instance of this light

† QUERE: is it this electric light which, when seen above, produces the "red sky" of the Southern Indian Ocean so well known there as the precursor of a hurricane?

one of a peculiar class ; being of small extent—of great violence,—of very moderate progressive motion—and probably not one travelling any distance to sea, so far as we are informed. There is no doubt that a considerable atmospheric disturbance was taking place all over the head of the Bay, as our Calcutta Barometers shewed ; and it appears to have resulted in the two or three violent little Cyclones which we have above recorded.

No. IV.

PREPARIS CYCLONE OF NOVEMBER, 1850, *With a Chart.*

This Cyclone is a second, and a very instructive instance of the occurrence of these meteors in the Andaman Sea and Preparis Passage ; where the little sea room renders them doubly formidable. It will be remembered that the first notice we had of Cyclones within this narrow Volcanic sea formed the Twelfth of this series of Memoirs, which detailed the wrecks and miraculous preservation of the crews and troops on board of the ships Briton and Runnimede. We have fortunately obtained for this brief Memoir, some very good logs of ships at no great distance from each other, and are thus enabled to say with considerable certainty what the track of the Cyclone was.

Abridged Log of the Ship COWASJEE FAMILY, Capt. DENHAM from Calcutta towards Singapore. Civil Time.

Nov. 17th, 1850.—A. M. wind E. N. E. and N. E. Daylight saw the land ; Working round the North end of the Cocos Islands. 9.15 A. M. centre of the Great Coco S. W. b. S. $\frac{3}{4}$ S. Noon steady E. N. E. breeze and rain. Lat. Acct. $14^{\circ} 10' N.$; Long. $93^{\circ} 59' E.$; Bar. 29.90. P. M. hard squalls N. E. 7 P. M. saw *Narcondan* bearing S. E. b. E. $\frac{1}{2}$ E. and at 9.30 it bore E. N. E. At 10 P. M. Bar. 29.50. At 10.30 wind “flew into the S. E. with terrific gusts.” Midnight, every thing blown or blowing to shreds, a perfect hurricane, and the sea making a clear breach over the ship, and clearing the decks, Bar. 29.20.

Nov. 18th.—A. M. “Still the same terrific gale, ship at times on her beam-ends. Daylight—ship a perfect wreck. Noon—a little more moderate. Bar. 29.35. Still a very hard gale. Ship lying very

uneasy, bore up and scudded N. N. E. Sunset more moderate, Bar. 29.40. Hove to again, head to Eastward, hard gale with constant rain to midnight.

Nov. 19th.—The same with a dreadful sea sounded in thirty-six fathoms water, and wore ship to the Westward. Daylight—gale broke, Bar. 29.55. Noon—fresh breeze and making sail.

Ship JAMSETJEE JEEJEEBHOY from Bombay to China—from a Newspaper notice in the Singapore "Free Press."

The ship *Jamsetjee Jeejeebhoy*, Captain G. Fitzmaurice, which arrived here on the night of the 24th instant, under Jury masts and Jury rudder, experienced a furious hurricane off the Cocos Islands, in the Andaman Sea, on the 18th November in Lat. $13^{\circ} 45'$ N. and Long. $93^{\circ} 40'$ E. in which she lost her rudder, was obliged to cut away her masts, and narrowly escaped being wrecked by drifting in a narrow channel between the Great and Little Cocos. The following are the particulars extracted from the ship's log with which Captain F. has kindly favoured us:—

"At 8 p. m. on the evening of the 17th November, the ship was going along with a fine fresh breeze from the North Eastward and clear weather, not the least signs apparent of a coming hurricane; the Barometers and Simpiesometer not indicating any change, being as high as 29.88, at which they had stood for some days previous. At midnight the weather suddenly became overcast, and dark clouds were rapidly rising, and before sail could be reduced, the wind had increased to a furious gale, with a tremendous high sea running. At day-light of the 18th, the wind had increased to a perfect hurricane, the wind veering round to the S. E. tremendous seas covering the ship, washing everything away from the deck, cabins and boats—the violence of the wind indescribable—blowing away all the topmasts; noon the water suddenly became discoloured, and on sounding found only twenty-five fathoms; the helm was immediately put up, but the ship would not answer her helm. The mizen-mast was then cut away but to no purpose, as it was found that the rudder was gone—cut away the mainmast; still the ship would not pay off—sounded in seventeen fathoms, cut away foremast, and let go both anchors when the ship brought up; at 10 p. m. the wind shifted to the S. W.—Hurricane

still blowing violently, and the ship entirely exposed to the tremendous seas that were continually washing over her. On the wind shifting the anchors both parted, and the ship drifted through the channel between the Great and Little Cocos; at midnight the weather moderating a little and the glasses rising; at daylight the gale had subsided, but a tremendous sea still running—found 8 feet of water in the Hold, and all the fresh water spoilt with saltpetre. The ship had drifted during the hurricane about forty miles to the N. Westward. The glasses were at the minimum at 4 P. M. of the 18th when they were as follows:—

Barometer,	29.15
Sympiesometer,.....	29.10
Aneroid,.....	28.96

December 27th, 1850.

Englishman, February 7th, 1851.

*Abridged Log of the Ship JOHN ADAM, Captain DIXON, from
Calcutta to Singapore. Civil Time.*

Noon, Nov. 17th, 1850.—Lat. by Obs. $14^{\circ} 58'$ North. Preparis Island bearing E. S. E. distance six leagues. Wind marked North, ship steering $2\frac{1}{2}$ and 3 knots to the E. S. E. P. M. wind marked N. E.; and at 2, E. N. E.; fresh breeze and threatening weather. 2 P. M. Preparis Island E. b. S. kept away to the S. E. for the South Channel. 4 P. M. South end of Preparis bearing E. b. S. distance twelve miles. At 8 P. M. dirty squally weather; in topgallant sails and double-reefed. Midnight heavy gales and hard squalls. Wind apparently* always E. N. E.

Nov. 18th—From 4 to 8 A. M. increasing bad weather. North Coco Island in sight distant six miles (bearing omitted by an error of the copyist). Noon strong gales and heavy sea. No observation. P. M., wind marked E. N. E. and at 3 P. M. *South*. 2 P. M. kept the ship away for the Preparis Channel; but at 4 P. M. she broached to and went over on her beam ends; lost mainmast and mizenmast, boats, &c. 7 P. M. blowing a steady hurricane. 8 P. M. lost the foremast,

* I say *apparently* for it is not marked again till P. M. of the next day; when it is still set down E. N. E. From the ship's position and the track of the Cyclone, it is not improbable that this was about its direction though it is much steadier, if so, than with the other ships.

everything in the cabins destroyed, including Chronometers, Barometer, Simpiesometer, &c. Midnight hurricane. Wind marked as "variable" and at 8 A. M. the next day S. East.

Nov. 19th.—Daylight the South Coco bore E. S. E. Set a sail on the stump of the mainmast and bore away N. N. W. Noon fresh breeze and cloudy North point of North Coco, bearing E. b. S. distant about eight miles.

Abridged Log of the Brig ERIN, Captain PLUM, from Singapore to Calcutta. Civil Time.

At Noon, Nov. 15th, 1850.—The *Erin* was in Lat. $11^{\circ} 1' N.$; Long. $96^{\circ} 16' East$; Bar. 29.89; Ther. 86° with fine weather. At midnight squally. Standing to the N. N. W. for the Preparis passage.

Nov. 16th.—Light variable winds and squally breezes from North to N. E. b. E and E. N. E. At noon Lat. D. R. $11^{\circ} 47'$; Long. Acc^t. 95.26; Bar. 28.59; Ther. 85° . P. M. moderate. Sunset cloudy and *lightning all round*; squalls increasing till midnight, when "continued hard squalls with rain, thunder and lightning."

Nov. 17th.—Continued squalls from E. N. E. to East, with torrents of rain and *heavy lightning*; vessel reducing sail, weather very dirty all round; Noon Lat. Acc^t. $13^{\circ} 29'$; Long. $95^{\circ} 5' East$; Bar. 29.89; Ther. 86° . P. M., wind is marked as S. S. E. to E. S. E. and East! 9 P. M. to midnight steady, strong breeze and clear; Bar: marked 29.90!

Nov. 18th.—Weather and sea increasing to noon. Wind East to S. E. and again at 5 P. M. "from S. E. to East and S. S. E. to E. S. E."* At 10.45 A. M. saw the Preparis Island bearing $W \frac{1}{2} S.$ hauled up N. b. W. being too near it. Noon it bore S. $\frac{1}{2} East.$ Cow and Calf S. b. E. $\frac{1}{2} E.$ (distance not given) wind East to E. N. E. P. M. gale increasing with high sea. Wind to midnight marked as S. E.; East; and E. S. E. to E. N. E. By midnight every preparation for bad weather was made, but the vessel making very bad weather; standing to the N. N. W. and North. Bar. at noon 29.75; at midnight 29.50. Brig always standing to the Northward and N. N. W.

Nov. 19th.—A. M. wind marked E. N. E. and East, to E. S. E. and

* So marked in the Log. It will be seen in the summary that there is a probable cause for these remarkable variations.



CYCLONE
 of the
Brig Erin
 Nov 17th 1850
 BY
 H. Piddington

S. East. Hard gale and severe squalls. At 1 A. M. hurricane; 1.30, vessel on her beam ends, cut away all the backstays. At 1.45 to 2 A. M. vessel upset with her masts in the water. Chief officer and Captain both washed overboard. Chief officer regained the vessel but the Captain perished. Vessel righted by the masts going. Cut away the wreck as far as possible. Hurricane continuing to 4 A. M.; at 5, gradually abating to a moderate hard gale; at 6 a fresh gale; at 7, wind West; noon wind S. W. moderate breeze and heavy swell.

SUMMARY.

The only records we have hitherto of Cyclones in this part of the Bay of Bengal are, the *Cashmere Merchant's* Hurricane off the Preparis 21st Nov. 1840, described in my Second Memoir (Journal As. Soc. Vol. IX. p. 433) and the *Briton* and *Runnymede's* Cyclone of Nov. 1845 (Twelfth Memoir, Journ. As. Soc. Vol. XIV.): and it is remarkable that this very severe one also occurs in the same month; in which also the French ship *Petite Nancy* was dismasted in the latitude of Cape Negrais and between Long. 90° and 91° East. It follows therefore that the seaman should be warily upon his guard in this vicinity in the month of November. I proceed to state the reasons on which the track of this Cyclone has been assigned; beginning with the *Cowasjee Family* which ship was at 7 P. M. on the 17th in sight of Narcondam, and but a few miles to the Westward of it at 9.30 P. M. when it was blowing a severe gale, which at about half-past 10 P. M. "flew round" to S. East having been before at N. East if the log is correctly marked. We may thus suppose that, as it was now blowing with hurricane violence, this was the centre of the Cyclone passing between Narcondam and the Andaman, and very close to the ship at that time.

We next find the same shift, apparently, from the imperfect account of the *Jamsetjee* at daylight on the 18th, and that the ship was drifting with the S. East gale till noon, when she anchored near the Cocos Islands, through which channel she drifted when the wind veered to S. W. so that we may suppose, she also was close to the centre, which thus passed in a N. N. W. direction over the Cocos Islands, travelling about fifty miles in seven hours and a half at this time.

We have next the log of the *John Adam*, which ship was approaching the Preparis passage from the Westward, but, as it appears from her log, was able to carry her top gallant sails till 8 P. M., but at

midnight had "heavy gales and hard squalls," so that we may suppose the Cyclone circles to have reached her position by this time, that is at midnight 17th to 18th November.

We have said above that from the shift of wind experienced by the *Cowasjee Family*, and that of the *Jamsetjee*, we might roughly estimate the Cyclone's rate of travelling to be fifty miles in seven and half hours, or, to the nearest decimal, 6.66 miles per hour; but as the exact positions both of the *Jamsetjee* and *John Adam* are uncertain, we may also take that of the *Erin* at midnight on the 18th and 19th, her log being the most carefully kept; which, supposing the centre to have passed close to her also when she was upset, will give us a distance of 150 miles from the place of the centre; at 10 p. m. on the 17th to that time, or for an interval of twenty-six hours, or again to the nearest decimal 5.77 per hour, for the Cyclone's rate of travelling. The mean of these two rates 6.66 and 5.77 is 6.21 miles per hour. Now as we have a position for the centre at half-past 10 p. m. of the 17th, it follows that if we project the track backwards for these ten and half hours at this rate of 6.21 per hour, it will give us about sixty-five miles, and we shall thus obtain an approximate place for the centre at Noon on the 17th. This spot falls in Lat. $12^{\circ} 10'$ North; Long. $94^{\circ} 8'$ East and in the absence of better data, I have also marked it with a circle of 150 miles in diameter, and this places the position of the *Erin* at Noon twenty miles without the true limits of the Cyclone circle, and accounts for the squally weather and heavy sea, which she now began to experience. I shall presently advert to the remarkable oscillations of the wind noted in her log.

To return to the *John Adam*. It would seem that it was at 4 p. m. of the 18th that she was blown over and dismasted, the shift of wind from E. N. E. to South noted in her log, having taken place at 3 p. m., and this we may take to have been the passage of the centre close to her. As before remarked, her position and that of the *Jamsetjee* are somewhat uncertain, not only from the imperfect notice of the one and the uncertain drift of the other, but also from the set of the tides and storm currents in the neighbourhood of the Cocos, and the North end of the Great Andaman; and again the track and rate of travelling of the Cyclone itself, were probably affected by the high land of the North Andaman also. We must thus

consider the centre at noon on the 18th, as passing up,* somewhere between the South Coco and the Andaman, where I have marked the centre with an (?) and continuing its route to the N. b. W. or perhaps even North, till it reached the unfortunate *Erin*.

The log and track of the *Erin*, it will be seen, is that of a vessel first running up parallel to the track of a Cyclone, and in fact *over-running* it until she was overtaken by the centre, when obliged to cross in front of it. Altogether a dismal instance of error and mismanagement; from the sad penalty of which she might have escaped by heaving to at any time between noon of the 17th and day-light of the 18th or earlier!

Her track and that of the Cyclone, considered together, will explain the remarkable squally weather and varying winds of the Cyclone noted in her log, for we find the track passing close to, or perhaps over, two volcanic Islands, Barren Island, from which there has been a recent eruption (1852) of considerable violence, and Narcondam; and then out between the South Coco and Andaman. We can easily suppose that the winds with the *Erin*, while running up almost on a parallel course with the Cyclone at from seventy to eighty miles distance only from its centre, were affected by this, whether we consider the islands simply as mechanical obstacles disturbing the regular motion of the air in its Cycles, or Barren Island and Narcondam as volcanic foci, (and therefore electric centres?) exercising some peculiar influence on the electric disk of the Cyclone? The *Erin's* log is kept with care, and was no doubt regularly seen by Captain Plum, who was a careful seaman, and bore a very high reputation in Calcutta. But, if I am correctly informed, he was unfortunately one of those commanders who, from disinclination to study and change of views, thought the Law of Storms a mere shore-going speculative theory, of no practical utility at sea.

We have no farther records of this Cyclone in the Bay so that it seems to have been lost or broken up about Cape Negrais. As an instance of a violent Cyclone in this dangerous and volcanic tract, it is very instructive to the seaman; and to the meteorologist and naturalist not less so.

* Perhaps even on a curved track, till it cleared the high land of the Andaman, for we know that high land does influence the tracks of Cyclones though we know not how, nor why it does so.

List of Arabic Works preserved in a Library at Aleppo, communicated by Capt. MACLAGAN, Bengal Engineers.

من وقف محمد باشا

- صحيح مسلم * صحيح البخاري * النسائي * الترمذي * ابي داود *
 حاشية الشيخ ابي الحسن السندي على سند ابي داود * التفسير الكبير *
 عدد كتب سنة للمحبي * المناسبات * تفسير ابي السعود * الدر المنثور *
 تفسير البغوي * تاريخ الخميس * التفسير الكشاف * شرح الجامع الصغير
 للعلموي * سنن ابن ماجه * متن الجامع الصغير * المشارق للقاضي
 عياض * حاشية الترمذي و النسائي * ابن ماجه * مجموع كتاب
 الجامع الصغير * مجموع شرح النقاية * الفتاوى الحديثة * شرح
 الهمزية * شرح مرآة الاصول * شرح ارقية المصطلح * شرح المشكاة * الاول
 و الثاني من شرح الشفاء للخفاجي * حاشية على شرح المحقق * شرح
 جمع الجوامع للمحبي * بهجة الناظرين * الهداية في تحقيق الدراية * شرح
 الشمائل النبوية * التبصرة في علم الحديث * تفسير المهدوي * نغمات المغيرية *
 شرح الشاطبية للجلال السيوطي * فضل الحيل * شرح المعراج للغيلوبي *
 حاشية مصطفى الانطاكياني * نفائس العرائس * شرح السراجية * الجزء
 الثاني من رجال الصحيحين * الجزء الثاني من الشفاء للخفاجي * البهجة
 النبوي في الطب النبوي . تحاف الرخصة في فضائل المسجد الاقصى *
 جمع الرسائل * المستطرف * المنهاج * تحفة الاصحاب * فتح الرحمة * الديات
 و الجواهر * تاللات العاتريدي * التصريح * متن الكافية * الجزء الاول
 من شرح حواشي التوضيح * مرور الصيت * المعنى في الاسرار * حاشية
 العمادي * ديوان العباس * الفتاوى للحاوي . حاشية التوضيح * الاشباه
 النبوية للبوجيري * الشجرة النبوية * امداد الفتاح * الفتاوى الحيرية *
 المدارك * التلخيص * ادب الكاتب * الجوهر و الدرر * مناقب الابرار *
 مناقب ابي حنيفة النعماني * الجزء الثاني من شرح الكنز * شرح الملحمة .

الجزء الاول من شرح الارشاد * فوائد الكافي * حاشية العزي * شمس السراجية *
 التلخيص فى المعاني والبيان * ملتقى الابحر * تحفة الملوك * شرح
 الجزرية * شرح الكنز * الحاشية على الفتاوى * شذور الذهب * الميزان
 للشعراني * الرابع من تفسير ابن عباس * مجموع الارشاد فى القرأة *
 شرح السنوية * شرح الاقناع * الجزء الاول والثاني من شرح نظم الكنز *
 الجزء الثاني من مختصر الانساب * الجزء الاول من تاليف نوح بن
 مصطفى الحنفي * تبيان الحكم * شرح سيرة الكبرى * السير الكبير للآدم
 محمود * شرح الكناية * الجزء الاول من تفسير القرآن لابن عباس *
 شرح مقدمة ابي الليث * منية المصلي * الجزء الاول من يتيمة الدهر *
 شرح القصيرية * تعريفات السيد * الجزء الثاني من المسيل * الايضاح *
 اليونانية * الشعر * تفسير غريب * القوافي فى العروض * مقدمات ناصر
 مطرز * مختار من محاضرات كتاب حسن ابي قاسم علي بن هشام * الجزء
 الثاني من تحفة الاخير * الفصول المحررة * الحاشية على العقائد *
 النصف الثاني من الجلالين * تفسير معالم التنزيل للبعوي * الجزء الثاني
 من الاحياء * تفسير القرآن للمشربيني * الجزء الاول من مهمات الاسنوي *
 الجوهرة للحدادي * شرح تلخيص المفتاح * الدر المختار شرح التنوير *
 حاشية الخفاجي على شرح التلخيص * شرح المغازي على جامع الصغير *
 شرح الالفية للاشموني * الجزء الرابع من ربيع الابرار * شرح النقاء للخفاجي *
 مغنى اللبيب * بساتين العارفين * نزهة المجالس * من المجلي من علم
 الحديث * القاموس المحيط * نسمة الازهار * مواقع النجوم * حاشية على
 شرح الاربعة حديثا لابن حجر * الديباج على صحيح مسلم * شرح الاجسام
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 جزء من تاريخ امين چلپى المحبى * شرح الطائفة المحمدية للبابلسي *
 حاشية حسن چلپى * المصاييح * عنوان الشرف * لب الاصول * المطول *
 التحرير في فقه الشافعي * التلويع * النصف من جلال الدين * السكيريون
 لابي حجلة * بشارة المحبوب لغفران الذنوب * الاول من تفسير الديثابوري *

الثاني من الهدى النبوي * الجلد الاول من الكواكب السيارة * ابي رجب *
 رياض الصالحين * مختصر المنار و فقه اصول و شرح المنار لابن مالك *
 شرح التوسيل باعل بدر * السري للشيخ الاكبر * لطائف الاشارات * عين
 الحيدوة * الشقاق في سموم الترياق * سراج القادر * البيان و التعريف في
 الحديث * من آيات * الاول من سعد اليمان * تركي * حاشية تفسير البغوي *
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 الجزء الثاني من نخبة الافكار * حسن چلپي للمطول * الجزء الاول
 و الثالث من شرح الحماسى * المطول * جواهر الفقهية * مجموع * الاول
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 شرح الورقات الكبير في الاصول * شرح الالفية لابن ابي قاسم * علي حسن
 الشهير بابي قاسم * اليتيمة * ابي البقي * مسائل مصابيح * فوائد العقائد
 في شرح الشواهد * المجمل في اللغات * حاشية على شرح الشمسية *
 حاشية حسن چلپي * المقتضب في علم الادب * شرح المراح * الاربعين
 في اصول الدين * شرح المبين في فتح الاربعين * شرح الالفية لابن قاسم *
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 البهجة * الجزء الرابع من شجى زادة * حاشية الغنيمي * حواشي العضد

للتونسي * الدقائق المحكمة * التوضيح لابن مالك * رسالة في اعدادات
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 مجموع فوائد * جامع بيان العلم وفضله * الكشكول * الفن الخامس من
 القانون * العزيزي * متن رحلة الشيخ مصطفى فى الرمح * متن التذوير
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 شرح جمع الجوامع بالعربية للمصنف * شرح الاربعين للبنوني * حاشية
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 شرح فصوص الحكم للبابلي * تفسير المفردات * شرح الكافية * حاشية
 الدماميني * شرح الدر * شرح المفصل * شرح الكفاية * روضة التعريف
 من حسب الشريف * صدر الشريعة * شرح الالفية لابن قاسم * الاول من
 مختصر الانسان لابن امشير * تفسير القرآن * ديوان المتذبي * مجموع
 رسائل استعارات * شرح نائية الشيخ الاكبر * حاشية الدر * الجزء الثاني
 من مختصر السيرة * الفتح الرباني * شرح الالفية لابن عقيل * مجموع من
 كتب ورسائل * رسائل الشرنبالي * شرح تجليات محمود افندي * حاشية
 على الدر المختار * تاريخ الدينوري * الجزء الثالث من ربيع الابرار * الجزء
 الثاني من الفتاوى الهندية * تركي لغات * الشقائق النعمانية * المستوي *
 شرح رسائل ملا حسين * الافصاح على معانى الصحاح * السعد التفتازاني *
 جوهرة المنظوم ومعها رسائل كتاب كمبذة الكبير * الهداية في شرح الشمائل *
 حاشية الاسناد المغني على شرح الهمزية * قصيدة البكرية * الكنز الاسنى *
 فتح القريب بشرح مواهب المجيد * شرح الهمزية لابن حاجب * رسائل
 للاستاذ عبد الغني * المولد الشريف لنجم الدين * شرح البخاري للشيخ
 اسمعيل العجلوني * شرح عبدالسلام للسبحة * النيشابوري مقدار كراريس *
 شرح دلائل الخيرات * نزهة المجالس * الامراء حكم * مقدمة ابي الليث *

مجموع من كتاب امداح الفتاح كراريس * شرح فصوص الحکم * الجزء الثاني
من الاحياء *

من وقف عبد الله باشا عظم

الجزء الثاني من المواهب الدينية * الاتقان من علوم القرآن * الغرائب *
شرح طريقة المحمدية * مطابقة الانوار * جزء من امن تذكري * شفاء
شريف * دلائل الخيرات * شرح التنوير للعالي * مزية المصلي * الجزء
الثاني من شرح المناهج * نصف جزء من شرح البخاري * نزهة الارواح *
الثاني من تحفة المنهاج * شرح البيضاوي * التحفة * رحلة القدسية *
ابراهيم الحلبي * مسند للامام الاعظم * مجموع كتاب الخلفاء للسيوطي *
الجزء الاول من المواهب * عيدون الشرف * الجزء الاول من الشفاء *
شفاء تركي * ديوان خليل افندي المرادي * الجزء الاول من البخاري *
برهان الدين الحلبي •

بيان وقف عمر افندي القوندية لي

ابراهيم الحلبي * طالع السعد * شرح الشمائل * ابراهيم عربشاه *
تلخيص الرموز * الفرائد * شرح دلائل الخيرات * تفسير القرآن * شمس
الشموس *

وقد وجد تسعة كتب بين الكتب المرقومة ليس بوقف

حاشية التلويح * دياباجة * طريقة المحمدية * الاول من الشافي *
ناقص لايعرف * مجموع * الدر المختار * الكيمياء * البعث والاشور *

1852



PARHELIA AND CORONÆ.

Observed 1st May 1852 7 1/2 m.

at

...

Notes upon some Atmospheric Phenomena observed at Darjiling in the Himalayah Mountains, during the summer of 1852.—By Captain WALTER STANHOPE SHERWILL, Revenue Surveyor.

The Sanatorium of Darjiling situated in the lower Himalayah Mountains, at an elevation of 7,126 feet above the sea, and distant from the perpetual snow thirty-five miles, affords both from its elevation and from its proximity to the vast masses of perpetual snow and glaciers, a favourable position for observing several very beautiful phenomena that occur at all seasons of the year; added to which I may mention, that the full force of the South West monsoon is felt in these mountains. The monsoon blowing over the Indian Ocean and Bay of Bengal arrives at these mountains, three hundred and seventy miles from the sea, loaded with moisture, and loaded to such an extent as to precipitate, yearly, one hundred and thirty-six inches of rain. Much of this moisture is retained by the soil and forests covering the mountains, which assists in forming the phenomena now under consideration, and which may be divided into three classes.

Firstly; those that are caused by great cold and depend upon minute crystals of aërially suspended ice for their prismatic colours.

Secondly; those that are dependent upon moisture for their prismatic colours, produced by the refraction of light in passing through clouds, fogs or mist.

Thirdly; those phenomena that are caused by cold and sudden blasts of wind rushing from the snows, which meeting the warmer air of the valleys, or the hot streams of air that rise from the plains of Bengal, serve to form clouds by condensation.

Of the *first* named class of phenomena I observed but two; the first was observed on the 21st May, 1852, at seven in the morning, the air was pure and bracing, Thermometer 55° in the shade; the sky to the East was covered with a dappled and streaked mass of cirro-cumuli and cirro-stratus, at a probable height of 20,000 feet. Upon this true "mackerel sky" was depicted one of those glorious coronæ, only seen at great elevations or in high Latitudes.

The weather at Darjiling had been for the whole previous fort-

night a succession of heavy showers, fogs and bad weather, but the morning of the 21st was the commencement of a bright sunny day; the power of the sun, when that luminary was at an elevation (calculated) of $17^{\circ} 34'$ was considerably dimmed, shining with a pale subdued light through the frozen mass of clouds in front of it; around the sun appeared a magnificent corona with a diameter of about 47° and nearly a complete circle Vide Plate II.; 300° of the circle being visible, the remaining 60° being occupied by a gap where the corona appeared resting on the summits and sides of the Eastern snowy range, down whose slopes the ends of the corona dissolved and lost themselves. The corona was composed of two colours, violet on the edge nearest to the sun and red on the outer edge, the two colours blending together and forming a neutral tint in the middle of the corona; the order here observed with regard to the colours is similar to that observed in the rainbow.

The true sun was flanked on either side at the distance of $11\ 45'$ by a parhelion or mock sun of a pale unrefracted light, at an equal altitude with the true sun, each parhelion forming the head of a segment of a circle with a radius of $23^{\circ} 30'$; the segments of the circles attached to the parhelia hung as graceful curving fringed appendages, converging to a point below the true sun. The parhelia were equal in size to the true sun, and were equi-distant from the corona and true sun. Above the true sun was a segment of another circle with a diameter of 47° and distant about 11° from the true sun, the concave side or the side away from the sun, was beautifully fringed with prismatic and violet-coloured rays or tongues of moving light, the sharp extremities of the moving rays pointing and flickering upwards.

The main corona from its great size presented a magnificent object, and its prismatic colours were most brilliant, almost as brilliant as the colours of the true rainbow; contrary to the custom of rainbows which places the spectator between the bow and the sun, and which enables the spectator to gaze upon this beautiful object in the heavens with undazzled eyes, his back being turned toward the sun—the corona and parhelia are always between the sun and spectator and thus from the glare of the sun, much of their beauty is lost.

Mariotte, Arago, Herschell and others have referred the appearance of corona or halos to the refraction and reflection of minute crystals of ice, floating in the atmosphere.

This grand picture lasted about a quarter of an hour and was succeeded by heavy rain at Darjiling, and a fall of snow upon the higher and neighbouring peaks.

In the next phenomenon witnessed, a totally different arrangement of colours to the last, consequent upon the refrangibility of light when passing through a bank of frozen clouds was observed.

On the 21st September, 1852, at 6-45 A. M. Thermometer 62°. The heavens to the East were overspread with fleecy cirro-cumuli at an elevation of five miles; beneath the cirro small, light and transparent cumuli occupied a lower region at a probable elevation of 10,000 feet. Upon the frozen clouds above and a little to the South of the sun, there was projected a portion of an arc whose radius might be 35° of the most brilliant and vivid colours, the edge away from the sun being yellow, and the edge nearest to the sun red; the intermediate space being occupied by a combination of all the prismatic colours, not a perfect amalgamation of the colours, otherwise the colour would have been white, but small particles of each colour appeared sparkling and wavering like the colours seen upon the inside of a pearl oyster shell.

At the lower end of the main segment, a distorted but very brilliant corona, was joined to it at an angle of 35°. This latter corona was about one-half the width of the larger segment, but much longer and with a similar arrangement of colours. Its shape, which resembled an S, threaded its way amongst a series of light flying cumuli until it disappeared amongst the small cirro-cumuli of the back ground.

A light easterly wind was blowing at the time with a drifting scud below the cumuli which occasionally obscured portions of the brightly-coloured coronæ. The two coronæ had a gentle motion towards the South.

The group was seen between the sun and spectator, and lasted twenty-five minutes.

The planet Venus shone brightly the whole time between the two coronæ.

As before remarked, the two phenomena just described were seen between the spectator and the sun, the spectator having his face turned towards the sun, and that they owed their brilliant prismatic colours to light refracted by small spiculæ of ice floating in the atmosphere; those now about to be described, on the contrary, were seen when the spectator was between the sun and the phenomena; and with the back turned towards the sun; and further they owe their prismatic colours to the refraction of light, falling upon minute vesicles of water containing air suspended in fogs; they are in fact *Fog-bows* and all those seen by me were seen early in the morning when the sun was 12° to 18° above the horizon.

The spectator must be placed between the sun and a fog; turning his face towards the fog he will see his figure reflected upon the opposite cloud, surrounded by a succession of concentric circles of brilliant colours, refracted by the watery particles of the fog; and following the order of the colours as seen in the rainbow. (Vide Plate III.)

A line drawn from the sun through the spectator's head to the common centre of the circles is a straight line.

The general appearance of a very perfect fog-bow, is as follows; by which it will be seen, that some of the colours of the prism are wanting, or taking violet or the upper colour of the solar spectrum as 1, numbers, 2, 3, 4 and 6, are wanting. The spectator sees his figure about thirty yards in front of him, surrounded by a disc of a greyish, or pinkish neutral tint, with a diameter equal to his own height, but with the head exactly in the centre; beyond this central disc which is edged on the outer circle with a pale violet, appear the following circles of colour, viz. violet, yellow, orange, their width bearing the correct proportion as ascertained by the prism, viz. the violet eighty parts; yellow forty; orange twenty-seven; the three circles occupy three semi-diameters of the central disc; beyond this first series of circles another series is visible, observing the following arrangement of colours; violet, green, yellow, orange; the circles being much broader than those in the first series, the brilliancy of their colours much fainter and rather confused. Beyond this second series of colours a colourless or white bow is sometimes seen with a radius equal to six semi-diameters of the inner or first series of colours, viz. from the centre of the disc where the spectator's head is reflected, to the exterior of the first orange colour.



Fig. 111. A rainbow as seen from a boat on the river. The sun is at the top. The observer is at the bottom. The rainbow is seen from a distance of 1000 feet. The sun is at an altitude of 30 degrees. The observer is at a distance of 1000 feet from the sun. The rainbow is seen from a distance of 1000 feet. The sun is at an altitude of 30 degrees. The observer is at a distance of 1000 feet from the sun.

Depending from the shoulders of the spectator is a dark neutral tinted pyramidal shade, resembling a flowing garment, occupying about 72° of the central disc.

From the outside rim of the inner yellow circle, long pencil-like rays of neutral tinted or gray colour, radiate in all directions, spreading and increasing in size in proportion to their distance from the centre, until lost in the surrounding haze.

The fog-bows with these spreading rays are very beautiful objects, but these rays are frequently wanting.

Another fog-bow commonly seen at Darjeeling, consists of the usual neutral coloured disc, one series of concentric circles exhibiting violet, yellow, orange and blue (this latter colour it will be observed is contrary to the regular order of the prismatic colours) beyond these circles at three and half diameters of the disc, comprising the whole of the four colours is the usual unicolour bow but no radiating pencils of gray colour. Depending from the shoulders of the spectator is the constant garment-like appendage. The figure reflected upon the fog, follows all the motions of the spectator, who, is the accompanying sketch is represented with his hat in his right hand, whilst the left hand is raised above his head.

For the sake of easy reference I append the colours of the solar spectrum, together with their values as ascertained by Sir Isaac Newton; also the order of the colours of the ordinary rainbow.

Order of the colours as shewn when refracted by the prism:

1. Violet,	80	} In the rainbow, violet is nearest to the sun.	|	5. Yellow,	40
2. Indigo,	48			6. Orange,	27
3. Blue,	60			7. Red,	45
4. Green,	60			—	
				Total length, 360	

and red furthestmost from the sun.

The upper rainbow from being produced by two reflections and two refractions of light, has its colours reversed.

Another, but transient and hurried, phenomenon of the second class is sometimes observed by a spectator, when he is standing with his back to the sun and looking down from a height upon a bank of snow-white cunuli, upon which the rising or very early sun is shining.

The bank of cloud becomes suffused with a shining opalescent light, too delicate to be described either by words or by colours; mingled with this opalescent tinge, distinct prismatic streaks or bands are observed following the order of the prismatic colours as arranged in the rainbow, but only displaying the three primary colours, viz. blue, yellow and red, which are repeated over and over again in succession.

The finest bank of this description I ever saw, was upon the 9th August, 1852; when standing upon the Singaleelah range at an elevation of 12,000 feet above the sea, I looked down upon a bank of snow-white cumuli that were about 5,500 feet below me, in the Nepal Territory. The Thermometer stood at 58°. These appearances so soft and delicate, last but a few minutes and then disappear.

It is an axiom in optics that a rainbow cannot be seen unless rain is falling between the spectator and that part of the sky which is opposite to the sun; the following description of a rainbow seen by me requires more explanation than I am capable of giving to it, to account for its appearance and anomalous position.

Upon the 25th September, 1852, at 2 P. M. Ther. 68° whilst standing at an elevation of 7,165 feet above the sea, the heavens partly overcast by heavy cumuli, and looking down in a North Easterly direction into one of the deep valleys, I perceived at 3,000 feet below me and two miles distant, a magnificent rainbow following for about one mile the exact wavy outline of the crest of a sloping mountain; the colours being, a very brilliant violet nearest the spectator, and then a dark and very vivid green, then yellow, red, then yellow; and upon the *next mountain* another red was shown; the trees in the forest, the Native clearances and their houses were all seen bathed in these vivid colours, but there *was no apparent rain falling*, only a brightly transparent mass of cumuli was passing over the sun, which obscured my position, whilst the bow and the mountain upon which it was projected were in bright sunshine.

The colours of the bow were far more brilliant than those seen in the brightest usual rainbow.

Phenomena of the Third Class.

The 29th May, 1852, was a warm, dry summer day and had been highly favourable to evaporation and, though invisible to the eye, the air was charged with moisture which suddenly showed itself in an extraordinary manner as a huge cumulus, fifteen miles in length at an elevation of 11,000 feet, which was rapidly formed by condensation of the invisible vapour caused by a chilled stream of air descending from the snowy-range distant thirty-five miles; the effects of this cold blast was first shown in the formation of a cumulus which rapidly formed, until as above described, it extended to fifteen miles in length and about 5,000 feet in thickness. This fine body of vapour was driven rapidly to the South, and as it approached the mountain Tonglo which rises to 10,009 feet above the sea, the lower portion of the cumulus, which had hitherto been stratus or nearly horizontal, began throwing down about twenty water-spout-like looking tails about one thousand feet in length each; which gyrated at a rapid pace increasing in length at the same time, until the whole cloud burst into heavy rain. The distance of the Tonglo mountain from the spot of observation was eleven and half miles, therefore the gyration of the tails must have been very rapid to have enabled me to see it with the naked eye.

The attraction of this cloud by the mountain must be referred either to electric causes, which caused the cloud to condense into moisture; or else that the cloud had entered a cooler atmosphere near the mountain than it had been travelling in before it reached the mountain Tonglo. Snow lies in patches in May near Tonglo (I have seen it in large patches on the 12th May) which of itself is enough to condense any cumulus, heavily laden with moisture.

That there was some attraction is beyond a doubt, as the tails one mile North and South of the central mass of tails descended at an angle of 45° with the horizon, and all seemed striving to reach the very summit of the mountain, upon which they all burst upon contact taking place.

The following rapid and consecutive formation and dispersion of clouds I have frequently observed during the summer months, when the sun, pouring down its almost perpendicular rays—Darjiling stands in North Latitude 27° —into the deep valleys, causes a rapid

ascent of heated air, and as rapid a descent of cold air to supply its place. Standing at an elevation of 7,000 feet and looking down into the valleys at the foot of the Goong range, South of Darjiling, small patches of clouds are seen to form at an elevation of about 2,000 feet, which with great rapidity rush up the side of the mountains, increasing in size at every hundred feet from the rapid condensation of the heated vapoury particles as they meet with a colder medium; upon reaching the summit of the lofty Goong range a mountain 7,400 feet in height and encountering a cold Southern blast from the upper regions of the atmosphere, they are again dragged down into the valley by this stream of air and at the same rapid pace they had ascended with; but decreasing in size until at an elevation of 2,000 feet they again disappear, then water particles re-expanding into an invisible vapour. I have seen this wild race of clouds kept up for hours until the sun sinking in the West and depriving the valleys of their heat put an end to this lively scene.

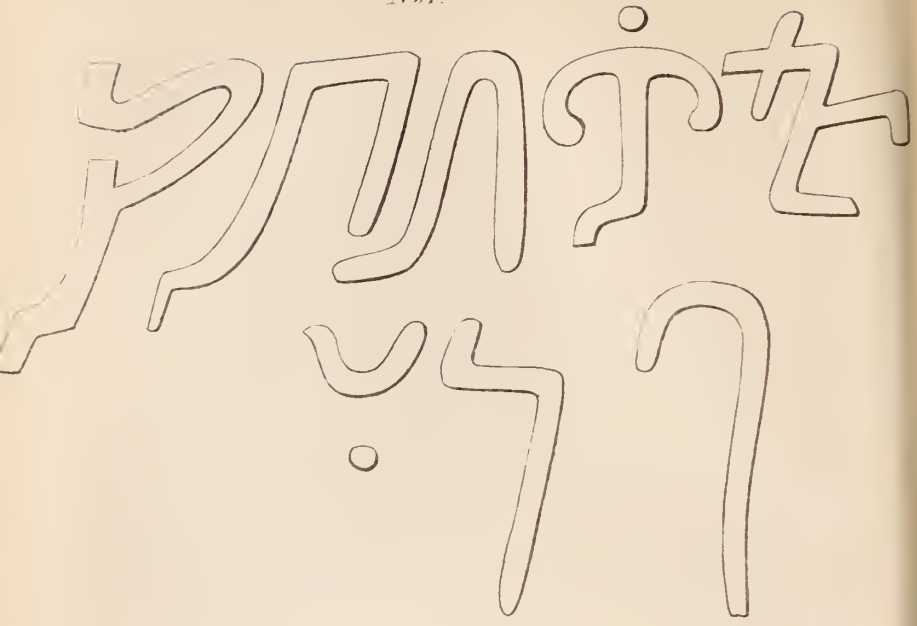
Looking down from Darjiling into the deep and capacious valley of the Rungeet river, the following beautiful appearance may generally be seen during the early mornings of the spring and summer. The valley, from the source of the great Rungeet to its junction with the Teesta river a distance of fifty miles, may be seen filled to the height of 2,000 feet with a heavy dense and snow-white mass of cumulus, resembling the softest and fairest carded cotton; the upper surface of the cloud upon which the spectator gazes is broken into a thousand softly outlined and rounded masses of cumuli. The whole mass has a gentle motion with the stream of the Rungeet.

This phenomenon is caused by the cold from the water descending from the suows and glaciers condensing the warmer vapour at the bottom of the valley.

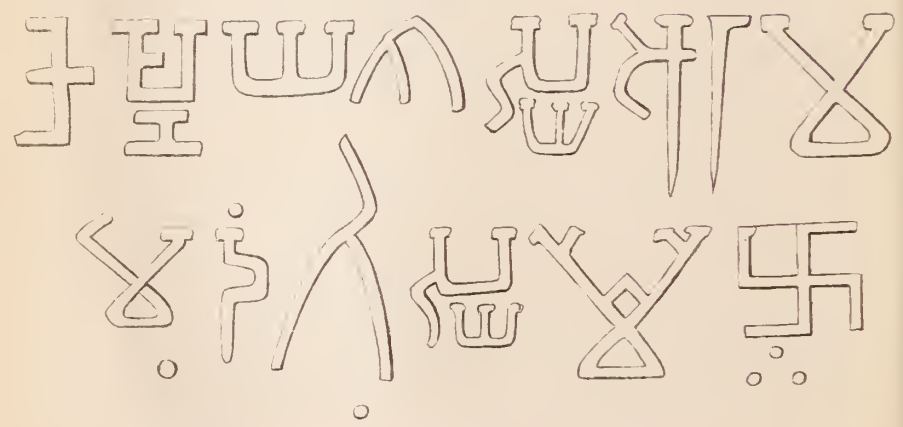
The sun's appearance and warmth is the signal for the dispersion of this very beautiful object.

The last phenomenon that I shall notice, is one that from its singular appearance has given rise to the idea that Kuuchinjinga, the highest measured mountain in the world, and which rises to the height of 28,177 feet above the sea, is a volcano.

N^o 1.



N^o 2.



Upon any fine summer day when the heavens are pretty free from clouds a long and white smoke-like horizontal cloud is seen extending for several thousand feet from the immediate summit of Kunchinjinga ; generally in a North Easterly direction ; as this cloud is never seen on both sides of the peak at the same time, and as the cloud has a visible motion to the north-east, and as it appears to rise out of the crater-like face of the mountain, it certainly has all the appearance of a continued supply of white sulphureous smoke being emitted from the peak.

It may be explained as follows ; a current of air passing over the warm valleys of Nepal is driven up the face of the snowy range, a portion of this current of warm air as it passes over the summit of Kunchinjinga is condensed by the bitter cold air on its north-eastern or Tibetan face and thus brought into sight.

An Indigo-planter, who had lived for forty years in the plains and in sight of Kunchinjinga, declared, that nothing would convince him that the mountain was not an active volcano.

Note on two Inscriptions at Khunniara in the Kangra district.—By
E. C. BAYLEX, Esq. C. S.

The two inscriptions, of which rubbings have been already forwarded, and of which copies by hand are now sent, are cut on two large granite boulders about thirty yards apart, near the village of Khunniara—pergunnah Rehloo, zillah Kangra.

They are situated in a field about half way between the village itself and the station of Dhurmsala on the edge of the high bank of a mountain torrent, which issues from the lofty Dhurmsala range about half a mile to the north-east.

They are so clearly cut that there can be little doubt as to the reading of either, one being simply—

“*Krishnayasasa áráma,*” in Arian Pali, (Plate I. No. 1) the other—
“*Krishnayasasya áráma mé dangisya.*” (Plate I. No. 2.)

No. 2, which is in the square Indian character, has two additional symbols at its termination, one is the mere “swastika,” the other,

Major Cunningham interprets as an abbreviation of the syllable "om." The purport of both inscriptions is therefore nearly identical.

"The garden of Krishnaayasas," to which in the second inscription some wag has apparently added the epithet "medangisya" "corpulent," from मेद् "méd" fat, and अङ्ग "anga" a body. The subject matter therefore deserves no further notice, save as regards the etymology of the proper name, which being compounded of कृष्ण Krishna and यशस् yasas "glory," and bearing in composition the meaning of "glory of Krishna" would seem to indicate the admission of Krishna into the Hindu Pantheon at the period (a very early one as we shall see presently) when the inscription was cut.

If however this be eventually established, it by no means follows that the name was applied to the same deity as at present, still less that he was worshipped in the same manner.

Leaving, however, the matter of the inscription, the employment of two alphabets, and the two *dialects* which the diverse inflexions point out, is a curious fact. Perhaps it may not be too much to infer that at the date of the inscription, the Jullunder Doab was intermediate between the territories to which each alphabet and each dialect was peculiar.

With respect to the *date* of the inscription, the form of the Indian letters had already lead me to assign them roughly to the first century A. D., on shewing them, however, to Major A. Cunningham, he kindly pointed out that the foot strokes of the Arian letters, ally them to those on the coins of "Pakores," and he therefore would place them more accurately in the first half of the 2nd century A. D. at the earliest.

Some other alphabetical peculiarities remain to be noticed. The most important of these, is the distinct use of the "anuswára" over the second letter of the Arian inscription, to represent the "n" of the Indian one, in the name "Krishna." Some versions of the name on the coins of Amyntos and Menander had already led Major Cunningham to suspect the employment of the "annswára" to represent nasal sounds in the Arian alphabet, it is now beyond doubt.

The first letter of the Indian inscription seems also to shew the expression used for the vowel "u" in composition which during the

period to which Major Cunningham assigns these inscriptions is left blank in Prinsep's comparative alphabet.

The second "s" of "yasas" has also a rather peculiar form, and the back stroke in the centre of the upright line of the initial "a" in "áráma" appears to be the distinguishing mark whereby it is made a long vowel.

For the drawings by hand I am indebted to Lieuts. Crofton and Dyas of the engineers who accompanied me on my visit.

I may add in conclusion, that I have in vain sought for any further traces of antiquity in the immediate neighbourhood of the inscriptions.



On the Ballads and Legends of the Punjab.—By Major J. ABBOTT.

In the eye of the Antiquary or the Lover of the picturesque, there attaches to old ballads and legends, an interest such as haunts the ruined edifices, sculptures and coins of a race long since extinct. In India these Legends and Ballads are confined to the mountain, the forest and the desert, or to the tracts adjoining either. In the more speedily subdued and cultivated plain, they seem to have been effaced with nature. Those of the Hindoo are often of a high order of moral beauty. But they have been neglected, and will soon be irretrievably lost. A few of these ballads and legends my very scanty leisure has enabled me to preserve.

Until the ideas of a nation have been matured and elaborated by the formation of a distinct class of literary mechanics, the most vigorous of its effusions will generally be found in the form of ballads handed down with their music orally from generation to generation: and forming the delight of the unoccupied gentry, who can neither read nor write, and who are indebted to their Bards for the murder of that heavy time, which can be spent neither at the board nor in field sports. Ballads therefore have an importance which is not to be weighed by their rude measure and occasionally childish fancies. They are the first effusions of the poetic fire, ere the Devil

had sent bad critics to spoil a dainty dish; and ere scholastic prozers had discovered the wondrous secret of drilling essays too heavy and lame for prose, into the goose step of verse. To please their audience, it was necessary to be ever alive. No learned dissertations, no elaborate arguments were required by the unschooled circle. They were children of nature with some strange exaggerated notions of the unseen world. But even their monstrous puppets moved with the ease of nature, and every deviation from her harmonious laws, was felt and resented as a blemish; and the slumber of the audience and their neglect of the minstrel were unmistakeable warnings that his style must be changed.

The interest I have ever felt in listening to these old traditional lays is not easily described. I remember, that it is the music to which have thrilled the hearts of a nation during centuries of unrecorded years. And I cannot but think that every scanty relic of this first poetry of a people, is worthy of rescue from oblivion at the expence of considerable pains.

It is impossible to touch upon any tradition of the Doaba* of the Indus and Jelum, without anxiously searching for traces of the vanished race of the Indo and Scytho Greeks whose coins and gems meet us in every old deserted site. This indeed forms the chief spell of every such research. *That* people, who burst in upon the darkness of barbarism accomplished in all the elegant arts of the most refined civility, to a degree unequalled by their successors in the lapse of 2000 years! What a strange spell of darkness and oblivion rests upon their annals of light, upon their past exploits, upon their ultimate destiny. It seems utterly unaccountable, that the multiplied descendants of those few but matchless conquerors, who, isolated from support by thousands of miles of desert and myriads of warlike foes, could yet maintain for a thousand years or more their supremacy in a foreign land; should thus totally have vanished from the face of the earth, leaving none to claim the proud title of offspring of the †Kings of Kings.

* For the general English Reader, Doaba is a tract between two rivers. We have no English equivalent, and therefore it is worthy of adoption into the language.

† Kings of kings—*βασιλευς βασιλεων* is the Title generally borne upon their

There is but one race in the Sind Sagur Dooaba,* whose name, physiognomy and history appear derivable from a Grecian source, I need not name the Gukkur tribe. By a negative argument, therefore, we might seem compelled to adopt a genealogy, which they themselves wholly disavow. I shall make no apology for delineating the points of resemblance, and of divarication between the Gukkur whom the Sikhs found dwindled to petty princes of Potowar, and the Grekoi whom Alexander planted in that spot and who, for about a thousand years, continued there to reign.†

The Gukkur in physiognomy is sometimes Greek, sometimes Persian. In general character, he is decidedly superior to the races around him, but not more civilized. He is accounted truthful, brave and honourable. The justice‡ of the Gukkur Sooltauns is still proverbial in their country. The Gukkur will give his daughter to none but a Gukkur. He is not a child of the soil. Has seldom any claim as a cultivator. But he has pretensions to the Kingly share—lately wrested from him. If not a ruler, his vocation is arms. But want has lately driven some to cultivate, which they consider degrading. They have no connection with Pathans or Hindu tribes, nor with any other class around them. In the earliest historical notices of the Sind Sagur Dooab subsequent to those of Greek writers, they appear as Sooltauns between the Indus and the Jelum. Thus they continued until the reign of Hoomaioon, who flying to them for

earlier coins, and on the reverse Raja Rajaon shewing that the term Maharaja is modern.

* I must however except the Awaun tribe, of whom I may write more anon. Yavaun is the name by which the Greeks were known in the Hindi annals. Awaun may be a corruption of this. The Awauns call themselves, however, Arabs. Supposing their account correct, we may doubt whether the Hindu records of Yavans refer to Greeks and not to this remarkable race.

† It was my pleasant task when Boundary Commissioner to procure the release from prison of about twelve of this persecuted race and to get provision made for several.

‡ It is said that one bleak night of winter Sooltan Sahrung sitting in his palace at Dhangullee, heard the gheclers yelling without, and judging that it must be from cold sent them out cloaks.

protection, was sheltered and defended by them from the usurper,* Sher Shah, which drew upon them the persecution of the latter, in which Sooltau Sahrung was slain. Faction afterwards arose in the family, and the little kingdom was split into two, viz. Dhangulli and Furwala, and subsequently into three principalities which were again subdivided. In this state they continued until the rise of the Sikh Sirdars who preceded Runjeet Singh. These, by their union and by the division of the Gukkurs, contrived to wrest from them the greater part of their plain territory, and Runjeet Singh by means of Raja Goolab Singh and Sirdar Hurri Singh completed their spoliation, imprisoning some and driving others into banishment. So much we know of them from other sources than their own histories and traditions. In all the particulars above recorded, they would answer well to the description of Indianised Greeks.

Of such descent however they have no tradition. They are not aware that their history is any way connected with the coins and sculpture of the Indo and Scytho Grecian Kings, or with the Topes, the latest monuments of the half Grecian race. They are wholly ignorant of the Greek character and being Moosulmans, their historical records, which are modern, are of course written in the Persian character. The Muhammadan invasion is the great stumbling-block of Indian history. Excepting the Pathans who being children of Israel, fondly believe that they had never lapsed into idolatry, all converts to Islam are ashamed of that page which preceded their conversion. They cannot bear to think themselves the sons of Kawfurs (Infidels). As the strongest expression of scorn—is not, “you dog”—but “you son or grandson or greatgrandson of a dog,” the disgrace increasing as the genealogy ascends (because a man is always supposed by Eastern piety to be a degenerate type of his father) so to be the remote grandson of a Kawfur is far more terrible to an Asiatic than to be merely in himself a Kawfur,† and thus they studiously conceal their annals previous to their conversion,

* The Massive Fortress Rohtass was built to controul their incursions.

† We have little right to blame Muhammadans for their absurdity, so long as we reverence more the rotten descendant of a great man than the virtuous offspring of a malefactor.

until such are wholly lost from memory. We must add to this, that it was a virtue of the first water in the eyes of the Muhammadan invaders to destroy all books excepting the Koraun, all temples excepting the Musjid—all coins having images of man or of beast.

About the 13th century, indeed the Muhammadans began to apply themselves to the construction of history, but with the same orthodox hatred of truth, whenever it appeared to them in any form but that of their preconceived notions.*

The devout historian, or the historian who wished to be read and admired by the learned, i. e. the devout Moosulman, felt shame and contamination in touching upon the filthy annals of Kawfurs. His own righteousness was liable to question in condescending to interest himself in the affairs of such sons of perdition. He would as easily have turned to trace the genealogy of unclean beasts from the days of Noah to the present. It follows that instead of seeking to lengthen his pedigree after the example of other races, the Muhammadan, if he be not a Pathan, (for Pathans fondly believe they have been Moosulmans from the days of Jacob) takes care to go back no farther than to the dawn of Islám, that he may interweave some fable of the conversion of the founder of his race. The Gukkur will be found no exception to this general rule: of which it is necessary to caution the reader, previous to an examination of genealogy.

The existing Gukkur histories give the following succession of Gukkur Sooltauns, whom they believe to have held first their Native province, styled by them † Kyán in Persia and Afghanistan:

* Ferishta may be cited as an exception to this rule in its more stringent sense.

† I cannot find in either Malcolm or Fraser's history of Persia any account of the origin of the term Kaianian applied to the dynasty which commenced in Kai Kohad. Dr. Herbelot derives it from the word Ky, in Pehlevi, signifying a giant or a great king. The ancient Hindu kings have sometimes the affix Bîr or hero, as Bîr Vikramaditiya. The province of Ghyn may possibly be the nursery of that illustrious family. A native of Ghyn would be called Ghyáni, which would easily pass into Kyáni, especially as there is no history or MS. of so early an age, and the ear only gave law to the orthography. Ghayn may very well have been at times a portion of Khorussaun; though I rather think it is not within the limit usually assigned to that extensive country.

to have been thence driven Eastward, until they had conquered the Sind Sagur Dooab, Cashmere and Thibet : then to have lost Cashmere and finally to have retained only the Northern portion of the Sind Sagur Dooab, where the Muhammadan annals first find them. Many old sites of Gukkur cities are found as far South as the salt range, and all these yield Indo-Greek coins to research.

In the *Raja Tarangini* nothing is discoverable that seems to relate to the conquest of Cashmere by the Gukkurs. But in like manner, that history is silent regarding the Greeks, who undoubtedly were Lords paramount of Cashmere, at one time, as evidenced by their coins and architecture. It is therefore impossible to place any confidence in the *Raja Tarangini*, when that history treats of periods long anterior to the times of its author.

The Gukkur history beyond doubt is a compilation of modern date from traditions then existing. I have added a column of parallel events affecting the destiny of the Punjab, to aid the general reader in judging of the value of these annals, which however are very meagre of incident.

The Gukkur Dynasty according to their own Records.

No.	Gukkur Sooltans.	Date.	Relation to predecessor.	Events in the Gukkur Annals.	Parallel events in other instances of the Punjaub.
1	Ky Gohr,	A.D. 655	..	King of Kyan in Persia, mighty as Ky Kaoos. Seems to have been dispossessed of the western portion of his kingdom, styled in these Annals Kyan.	A. D. 650. The Muhammedan empire extended to the Oxus by the Arab conqueror. Cabul annexed—Prince of Cabul becomes tributary to the Arabs who make 12,000 converts. A. D. 668. Cabul having revolted, is invaded, Arabs defeated. A. D. 686. Cabul conquered by Abdool Rehman Governor of Khorussaun.
2	Kyde,	676	Son.	Conquered Thibet and grafted Islam upon the dwellings of owls. Making a paradise for the Hooris in every place of fear among the mountains haunted by Deeves and Purris.	Abdool Rehman rebels, assisted by prince of Cabul. Defeated, destroys himself A. D. 704. A. D. 686. The Gukkurs join the Afghauns and compel the Raja of Lahore to cede to them territory.
3	Tibbut or Fulluk Sooltan,	697	Son.	....	A. D. 711. Sinde conquered by the Arabs.
4	Junnut,	718	..	....	A. D. 712. Arabs conquer Transoxiana. Empire of the Khalifs.
5	Shoojarr,	739	Son.	....	Ditto.
6	Muddaruk,	760	..	....	Ditto.
7	Bhyramund,	781	Son.	....	Ditto.

No.	Names of Sultans.	Date.	Relation to predecessor.	Events in the Gukkur Annals.	Parallel events.
8	Nuzzur,.....	A.D. 802	Son.	....	Empire of the Khalifs.
9	Kalib,	823	Son.	....	A.D. 820. Khorussaun and Transoxiana separated from the Khalifat under the Fahirites.
10	Dowlut,.....	844	Son.		A.D. 872. The Sofarides.
11	Sooltan Khaun,	865	Son.	Cashmere reduced to obedience; Thibet wrested from him by the Chinese. Monowurooddeen of the Chuk tribe compelled to give his beautiful daughter Dillahn to Furkh or Ferokh.	A.D. 903. The Sofarides lose all but Seistan, which they retain until about A.D. 1000. A.D. 903. Rise of the Samani dynasty, which had more connection with India. A.D. 961. Ulpteughin rebels and founds a separate kingdom at Herat, Bulkh and Seistan.
12	Kawb,	886			
13	Ummir,.....	907	..	....
14	Ferokh,.....	928	Son.		
15	Yezdahd or Ulladahd,.....	949	..	....
16	Khyrooddeen,	970	..	Retained possession of Cashmere which may mean either that he lost the rest of his realm, or that Cashmere was lost after him.	A.D. 977. Subukteghin succeeds, is invaded by Jypanul Raja of Lahore, invades Jypanul who is aided by the Rajas of Delhi, Ajmir, Kalinga, Kanauj, but is defeated at Lughman.

17	Golur Gunj,	A.D. 991	..	....	A.D. 999. Maemood of Ghuzni commencing his reign. A.D. 1000, defeats Jypaul of Lahore near Peshawur, and storms and plunders Batenda Trans-Sutlej. 1000. Reduces the Raja of Bhuttia south of Mooltan. 1004. Defeats the Afghan chief of Mooltan near Peshawur. 1008. Defeats the united armies of the Hindus and Gukkurs near Peshawur, after having nearly lost the battle to the Gukkurs 30,000 in number. Plunders the temple of Nuggurkot or Joalla Mookki. A.D. 1011. Plunders Ghaunaesur. 1017. Kanoj submits, Muttra plundered. 1023. Lahore annexed to Ghuzni. 1024. Plunder of Somnath, 1030. Muksood ascends the throne, struggles with the Seljuks and dies A.D. 1040.
18	Noorooddeen,	1012	..	....	A.D. 1035. Rise of the Seljuks.
19	Mirdahd or Moorahd,....	1033	..	....	Seljuks.
20	Bukhtiarr,.....	1054	Son.	....	Ditto.
21	Auzum or Aam,	1075	Son.	....
22	Soomund,	1096	Son.	....
23	Kurraub or Myraub,	1117	Son.	....
24	Roostum,	1138	..		Cashmere lost—Cabul, part of Huzara, the Sinde Sagur Doab to Mittunkote retained. An expedition against Cabul. Roostum a great warrior murdered at night in an insurrection.

No.	Names of Sooltans.	Date.	Relation to predecessor.	Events in the Gukkur history.	Parallel events in Asiatic history.
25	Tillochun Shah,	A.D. 1159	..	....	A.D. 1153. Fall of the Seljuks.
26	Muddud Shah,	1180	..	....	A.D. 1157. Ghyasooddeen founds the Muhammadan empire in India.
27	Jehan Shah,	1201	..	....	A.D. 1179. Gukkurs aid Khoosroo Mullik successfully against Ghyasooddeen.
28	Ruttun Shah, in some list Zyne Shah,	1222	..	....	A.D. 1186. House of Ghuzni expelled the Panjaub.
29	Gukkur Shah,	1243	..	Buried at Cabul where is his Zearut or Shrine. After him Cabul and Peshawur were seized by the Unmir Timoor and became the property of the Tehoguttia (Zagatai) family.	A.D. 1191. Shahabooddeen and army routed at Thaneswar by the Hindoos under Pritwi Rajah of Ajmir.
30	Baz ali Khaun, } alias } Bijli Khaun, }	1264	Son.	Conquered the Dhoond and Sutti mountains, taking as hostages the daughters of those tribes. Dwelt for security at Dhahngulli. Conquered the inhabitants of Kuk, Kaloo and Kybri.	A.D. 1193. Shahabooddeen defeats the Hindoos and takes Delhi, Ajmir, Koel, Kanauj, Benares, &c.
					1195. Another irruption of Shahabooddeen into India. Muhammad Ghori defeated in Khanrizm. The Gukkurs take Lahore and devastate the Panjaub. Muhammad Ghori recovers Mooltan, and converts the Gukkurs to Islam. The Gukkurs enter Muhammad Ghori's tent on the Indus at midnight, and murder him, March 4, 1206. A.D. 1206 Kootubooddeen king of India, Muhammad Ghori king of Ghor. Eldoz of Ghuzni. Nasirooddeen of Mooltan, A.D. 1215 Ghuzni taken by the king of

Khaurizm. A.D. 1211. Shumsooddeen, A.D. 1217. Irruption of Chenghiz Khaun. A.D. 1221. Expelled king of Khaurizm, makes alliance with the Gukkurs and takes Sinde. Then goes to Persia and takes possession, is slain in Mesopotamia. Altumsh invades Mooltan and takes it. Nusirooddeen drowned in the Indus. Altumsh reduces all India to subjection, dies A.D. 1236. A.D. 1236 to 1240. Ruknooddeen, Sultana Rezia, Moizooddeen. Irruption of Moguls into Punjab. A.D. 1241 two other irruptions. Alaoodeen, and A.D. 1246 Nusirooddeen chastises the Gukkurs, places Sher khan as Governor of the Punjab, who takes Ghuzni. A.D. 1266 Ghyasooddeen. Moguls defeated in the Punjab A.D. 1280. A.D. 1286 to 1288. Keikobad. Authority much relieved under Julalooddeen. Defeats the Moguls in the Punjab. A.D. 1295 Alaoodeen. A. D. 1298 Mogul army defeated at Delhi, other Mogul inroads. A.D. 1317 Moobarik. 1321 Khoosroo,—here ends the Khilji dynasty and begins that of Toghluks in Ghyasooddeen. A.D. 1325 Muhammad Toghluks, Mogul irruption into the Punjab bought off. A.D. 1338 Malik Byram rebels in the Punjab. 1340, Afghans ravage the Punjab, and are succeeded by the Gukkurs. 1351 to 1388 Feerooz. 1385 to 1398 four kings of the Toghluks dynasty. 1398 Timoor Lung takes Dehli. A.D. 1414 to 1450 interregnum. Then Behlool Lodi.

	<i>Sooltan.</i>	A.D.
31	Mapaul,.....	1285
32	Mózum or Móm,.....	1306
33	Ashi or Ghazi,.....	1327
34	Raj Khaun or Rah Khaun,	1348
35	Lukkun,	1369
36	Sippehr Khaun or Sheer Khaun,	1390
37	Mungh Khaun or Munga Khaun,	1411
38	Lyhr Khaun,	1432

No.	Names of Sooltans.	Date.	Relation to predecessor.	Events in the Gukkur history.	Parallel events.
39	<i>Sooltan.</i> Kudd Khan,	A.D. 1453			
40	Mullik Goolia,	1474			
41	Bir,	1495			
42	Mullik Tatarr,	1576			
43	Sahrung,	1537	..	Celebrated for his justice, dwelt at Dhanguli, espoused the cause of Hoomaioon, and was slain by Sher Shah within sight of his palace. His skin was stuffed with chaff and exposed on the road side.	A.D. The Punjaub re-annex to Delhi, under Behlool. A.D. 1524, Baber conquers the Punjaub. A.D. 1526, Baber takes Delhi and Agra. House of Timoor. A.D. 1530. Cabul and the Punjaub separated from India in Hoomaioons' reign. Rise of Sher Khan. A.D. 1540. Defeat of Hoomaioon who flies to Lahore and thence retires to Sind and afterwards to Marwar, thence to Umrkôt where Ukhbur is born. A.D. 1542. Hoomaioon escapes to Seistan, thence travels to Herât. A.D. 1540 to 1545 reign of Sher Shah, killed by the explosion of a magazine. Sher Shah takes possession of the Punjaub and builds Rohitass, A.D. 1541.
44	Audum,	1542	..	On the return of Hoomaioon Audum was required to give up half the Gukkur kingdom to Kummál son of Sahrung. Refusing compliance he was defeated and slain by the imperial army.	
45	Kummál Khan,	1553	..	Lushkuri son of Audum escaping levied an army and slew Kummál Khaun near Furwala. Lushknri received from the Emperor the country eastward of the Sohaun River. The western lands were bestowed upon the son of Kummál	A.D. 1545, struggle of the sons of Sher Shah for the empire. Adil disappears. The contest however with Selim is maintained by aid of the Gukkurs and the Niazi for 2 years. Selim Shah dies A.D. 1553, Adil Shah succeeds. Rebellions in the Punjaub. Ukhbur takes the Punjaub from the rebels, defeats the imperial army led by Hemu at Tamput A.D. 1556.

46	Lushkuri Khan,	1574	..	Reigned over the Dhangulli or eastern division of the principality.	Hoomaioon resumes his reign, A.D. 1552. The Gukkurs betray the fugitive Kamran to Hoomaioon.
47	Jullal Khan,	1595	..	Dug the tank at Kooroonta.	A.D. 1557. Hoomaioon dies, Ukhbur succeeds. A.D. 1581. Mirza Kalim takes the Punjab. A.D. 1581. Is driven out by Ukhbur who recovers Cabul. A.D. 1587. Recovers Kashmir. The imperial army under Bir Bul and Zyn Khan defeated in invading Sohaut, A.D. 1586. A.D. 1605. Death of Ukhbur, Jehangeer. Prince Khoosroo takes Lahor. Is defeated by the imperial army at Lahor and captured at the Jelum. A.D. 1626. Mohubbut Khan Afghan seizes the Emperor at the Jelum. Noor Jehan rescues the Emperor.
48	Mymood Khan,	1616	..		A.D. 1627. Death of Jehangeer. A.D. 1658. Shah Jehan deposed by Aurungzeeb.
49	Ukhbur Kooli Khan,	1637	..	.....	A.D. 1707. Aurungzeeb dies after being engaged all his life in war with the Maharrattas. Bahadoor Shah.
50	Moorád Kooli Khan,	1658	..	Built or repaired the palace at Dhangulli.	A.D. 1675. Hur Govind, 10th king of the Sikhs, is driven into the mountains, A.D. 1711.
51	Ulla Dád Khan,	1679	..	.....	A.D. 1712. Death of Bahadoor Shah. Jehandar Shah put to death A.D. 1713 by Farokhseer.
52	Dooloo Dilawur Khan, ..	1700	..	His tomb is at Pullákur.	A.D. 1716. Devastations of the Sikhs, who are defeated with slaughter, Farokhseer put to death. A.D. 1719. Muhammad Shah. Revolt of the Afghan Chief of Kusoor. A.D. 1738. Invasion of Nadir Shah 1739,
53	Moowuzzin Khan,	1721	..		
54	Mookurrub Khan,	1742	..		

No.	Names of Sooltans.	Date.	Relation to predecessor.	Events in the Gukkur Annals.	Parallel events.
		A.D.			<p>takes Delhi. A.D. 1747. Ahmed Shah crowned at Candahar. Occupies the Punjab, repulsed in his advance upon Delhi by Ahmed Shah of Hindoostan.</p> <p>A.D. 1748. Death of Muhammad Shah, Ahmed Shah.</p> <p>A.D. 1757. Second Doorani invasion. Punjab ceded to them.</p> <p>A.D. 1754. Death of Ahmed Shah. Anlumgeer.</p> <p>Third invasion of Ahmed Shah Doorani who takes Delhi. Retires A.D. 1758 Ragoba Maharatta takes the Punjab and drives out the Dooranis.</p> <p>A.D. 1759. Fourth invasion of Ahmed Shah. Murder of Aulumgir 2d.</p> <p>Ahmed Shah defeats and annihilates the Maharatta army at Paniputt.</p>
55	Shah Khan,.....	1763	..	Imprisoned by Raja Goolab Singh. Died in prison.	
56	Raja Hyatoolla Khan, ..	1808	..	Son of the above being released from the Jumboo prison by British interference, holds a very small Jaghir in Huzara, is about forty-five years of age.	

Alexander's enlightened policy caused him to marry a daughter of Darius, and to persuade his followers to intermarry with the Persians. Thus in Persia the Greeks were naturalised and the two races were interblended. There can be little doubt that his successors in Bactria and Ariaia pursued the same sound system. And thus we see Ferdoosi, the sole historian of Persia, take advantage of this intermixture of races, to represent Alexander as a native Persian and his conquest as a mere change of Sovereigns.

Now the family of Cyrus the Great (Kykheosroo) after their loss of the Empire, retired to the patrimony of Roostum in Sceistan where their descendants* yet remain, and it seems probable that during the Parthian and the succeeding dynasties, this illustrious family ruled their own hereditary province as tributary Princes. But in any case, it seems likely that the Greek and Perso-Greek Princes of Ariana would ally themselves with a house so illustrious, and which the Persians had invested with something of a sacred character. This was a natural means of consolidating and perpetuating their authority. The issue of such an union, unable to derive themselves from Alexander (the only Greek whose name survives in their traditions) would inevitably trace their genealogy through the maternal stem, and claim to be offspring of the so-styled Kings of Kings. The amalgamation of the two races, would soon be as complete as that of the Normans and Saxons, whilst the name Gukkur may very well be a corruption of the name Grekoi. The Gukkurs it is true, suppose this name to be derived from one of their Sooltans, Gukkur Shah, whose tomb is at Cabul. But we read of the Gukkurs as powerful chiefs, bringing into the field 30,000 of the choicest troops as early as the age of Mahmood of Ghuzni, i. e. 400 years prior to the existence of Sooltan Gukkur Shah.

Let us assume a parallel instance, and suppose an obscure Captain of William the Conqueror's army to have succeeded to the throne

* Two of them called upon the British Envoy at Heraut in A. D. 1839 when I was Asstt. Envoy there. One of them Julalooddeen Khan was a man of remarkable personal beauty and stature ; so much so, as to arrest general attention when he went abroad. Humza Khan, the eldest, was 7th in descent, since the family had been driven into Sceistan.

of Wales, intermarrying there with a royal bride Ap Shenkins, ap Morgan, Ap Jones. Let us suppose the descendant some hundred years afterwards to be driven out of Wales into some obscure island of his former kingdom, and there to set up a petty monarchy: who would venture to remind this new king of his descent from the obscure Captain de Vere? Bard and courtier would alike forget the intruder, and after histories of the royal house would record only the exploits of the illustrious Shenkins or of the immortal Jones.

Had not the Muhammadan faith uprisen to blot from the earth's bosom whatever was blessed in social or graceful in public life, we might still have Grecian or Páli histories of the fourteen centuries, now erased from the annals of the world. The monumental sculptures alone, would, like the coins, have presented an unbroken series in the history of the human mind; from the moment, when vigorous, matured and accomplished, it leapt into being, like their own virgin goddess, amid the blackness of an unarranged chaos; to its gradual obscuration and final barbarity, by amalgamation with surrounding night.

But a wide field of discovery and research is opened to us by our possession of the Punjaub. Here we stand upon a mine of buried relics at the very junction of the Grecian with the Rajpootre tribes. Here we have the probable birth-place of that Rám Chundre,* who is the hero and progenitor of the most illustrious Hindu race. Coins bearing his effigy and name, abound in every deserted site. It was

* The Sindh Sagur Doab is full of traditions of Rám Chundre. He is said to have been born at Furwala, near Rawalpindi (afterwards the capital of a petty Gukkur Sooltaun) and to have wandered Southward to Rajgurh, ploughing upon the road a gigantic furrow, from the Western foot of the Kurungli Mountain, which is to this day called Rama Hullana, or Rama's furrow, being in fact a cleft or chasm between two parallel strata of sandstone. Hindus object that Rám Chundre was from Aodia, or Oude. But the ancient Hindi name of Huzara and its Northern Mountains is Oodiana. And the singular disappearance from history of the kingdom of Aodia after the death of Raam, may well cause doubt, whether the modern Oude can be the birth-place of Raam. Although the author of the Rámáyana may in ignorance of the geography of these parts, have adopted the Aodia best known in his day.

impossible not to perceive at a glance, that the figure of the horseman in the graceful ease of its outline had been derived from Grecian models; whilst the horseman's turban and physiognomy are precisely those of the Goojjur tribe, the oldest race in Huzara. But I had no hope of ever finding farther proof of Rám Chundre's connection with the Greeks until a silver* coin was brought me, bearing his effigy on the one side, and on the reverse a Grecian legend.

This curious discovery served as a connecting link to a chain of circumstantial evidence, which has been gradually forming in my mind. The type of Rám Chundre was in use upon the coinage of the Punjab, whilst Greek continued to be the language of the Court. Who then was this Rám Chundre? and was the fabulous demi-god here alluded to? or was Rám Chundre the name of the reigning King, since deified by the spirit of hero worship? Hindus reckon several Rám Chundres. The first was probably that Osiris who extended his peaceful conquest to the Punjab. A colony planted by him was found by Alexander in the country between the Indus and the Loondi River. The town of Leeia on the Indus yet bears his name. At the festival of the Rám Leila, a festival undoubtedly established by him, all the emblems of the Bacchanalian revels are still preserved. And Arrian remarking upon the fact of Alexander's fleet being followed by the Indians along the Hydaspes with song and dance, observes that Indians have been lovers of the song and dance beyond all others ever since they revelled with Bacchus on Indian land.

But besides this Rám Chundre whose name Rám Iswa or the Lord Rám is so remarkably like Rámeses, as to cause doubt whether Osiris and Rámeses were not one, there was at least one other Rám, whom Hindus are careful not to confound with the first. The birth-place of this Raam was Aodia,† a name at the present day applied almost exclusively to Oude: but formerly the Northern por-

* See No. 11, of the Plate.

† The Ayodia which was the birth-place of Raam the Conqueror is merely mentioned as such in the Puranas, and does not again appear in Hindu history. It is probable therefore that it was not then a very considerable place, however extolled by Hindu poets of after days. Raam is stated to have conquered the Dekkun, i. e.

tion of the *Sinde Sagur Dooab* or land, included between the *Indus* and *Hydaspes* was called *Aodiana*. In this land the commonest* silver coin of antiquity is, that which bears the effigy of the hero or king *Raam*, and on the reverse a bull seated, with an inscription in Sanscrit, varying on different types. On one it is

Asawrari Sri Samagu Dewa,

or steed of his excellency the god *Shib*—an inscription which may have led to the fable which confounds *Shib* with *Rama*. On other coins occurs in the same place, the inscription

Sri Raam Poodup,

the seal of his excellency *Rám*, or the seal of the wife of *Ráam* or power of *Raam*:—whence first this class of coins were called *Sitla Rami*, a name which has been extended to the whole of the *Baktro Greek* series by the natives.

On other types it is

Sri Raam Oodye—Sri *Ráam*'s effulgence.

On others

Sri *Ráam* Numma, or service to *Sri Rám*. On others *Madána pála deva*, the god, cherisher of the world.

Now, where the bull is called the steed of his excellency *Shib*, it is manifest that *Shib* and the horseman are two distinct personages, otherwise the bull and not a horse would have been mounted. The horseman therefore is in all probability as in other *Indo-Greek* coins the reigning monarch: and if so, the inscription, the seal of *Sri Rám* will imply that such was the monarch's name. If the horseman be other than the reigning monarch, it is a deviation from the system observed in the series of coins to which it belongs.

Now it is singular, that whilst the land producing this coin is called *Aodiana*, and whilst local tradition every where breathes of

the Southern country. But *Elphinstone* observes that he could not have conquered what we now call the *Dekkun* previous to the compilation of *Menu's Institutes*, for that then no Hindu occupied those countries. Supposing that he had been born in the *Sinde Sagur Dooab* according to local traditions, he would have conquered the *Dekkun* or South country in conquering Central India or *Rajpootana*. In the *Sinde Sagur Dooab* on the right bank of the *Jelum*, are the ruins of an ancient town called *Oodinagr*.

* See Nos. 10 and 13 of the Plate.

Rám Chundre, who is the Heri or Hercules of the Hindu, there should turn up a coin, having this horseman on one side, and on the reverse a Greek inscription, of which two words are beoh, and Erak lirè Ἡρακλιρε, and that where these coins occur, there should be an old fort upon the Indus above Umb, called to this day Behoh, founded by a Kawfur, i. e. a person of antiquity who with his brother Rám (according to local tradition) reigned along the Indus, from Behoh to Atuk.

It is singular also, that the only pure Rajpootre race of India dwelling in Rajpootana have architecture similar to that which is dug out of the ruins of Greek cities in the Punjaub, and which is no where else known in Asia, if we except Cashmere, where the Greeks reigned, as evidenced by their coinage.

It is remarkable also, that whilst Greek historians mention the divisions of Hindus into castes, and that in battle they bore upon a standard the effigy of Hercules, none of them mention the very remarkable circumstance of one of those *classes* deriving itself from Hercules. That they were not struck with this remarkable division of the community which is so far superior to the rest. That yet they should mention the Σιβι (Sibi) or Chibbs (also Rajpootres) as being of Heraklean descent, as evidenced by the use of the club, the dress of hides and the impression of a club upon their cattle. The Kshettri or Khettri division may not then have derived itself from Rám. May not then have borne the proud title of Rajpootre or royal blood. The Rám who carried Southward from Aodia his victorious arms may not then have appeared. The Rajpootres at present found in the Punjaub (the Chibbs perhaps excepted) all appear to have come from the South.

May not then this coin be the currency of that Ram Chunder who conquered from Aodia to the Southward and founded the Rajpootre race? If so, he was probably an Indo-Greek as implied in the Greek and Sanskrit inscriptions, and then the superiority of the Rajpootre of central India to all other Indian races in beauty, valor and virtue—his startling resemblance in feature, figure and dress to the Greek mountaineers (to which I can bear personal testimony) and his use of the architecture and sculpture peculiar otherwise to Indo Greeks, are all accounted for.

In his history of Marwár, Tod derives the Rahtore Rajpootres from a Yavan (Greek) king of the Aswa tribe called Yávánaswa of Parlipoor in the North. Yet the author himself styles this, "Seythian ancestry."* The word Parlipoor should probably be rendered Pálipoor, and may have been used by the vulgar to designate the capital of the country, in which Páli was spoken.

In like manner the royal family of Mewar, the purest of the undescended race, derive their origin from Nowshirwan who ascended the throne of Persia, A. D. 543. It is manifest therefore, that their genealogical rolls, beyond that period at least, are pure fictions, and that they have been Rajpootres no more than 1300 years.

It is a remarkable circumstance that in a list of kings of the Solar line following Vikramaditiya, with which an intelligent pundit of Huzara furnished me, the 8th in succession after Vikramaditiya, is Ram Chunder, who therefore ought to have flourished about A. D. 111 or 438 years after the Macedonian invasion, a period at which, it is certain from the remaining coins, that the Grecian character was in use.

I give this list, although I do not know its history.

After Vikramaditiya—Sooruj bunses.

1. Equoikoo.
2. Kurnn Raja.
3. Urjun Paul, his son.
4. Raja Shah or Gur Kotarr, his son.
5. Syj Indur, his son.
6. Nonungh Daiv, his son.
7. Rám Singh, his son.
8. Rám Chunder, his son.
9. Meidun Mull of whom Midnapoor.
10. Urjun Deo, his son.
11. Roodur Moon of whom Orissa.
12. Bhurt Chund, his son.
13. Mudkur Shah, his son.

* He perhaps alludes to the "aswa," the Sanskrit for horse. But by the change of a single letter aswa becomes "iswa," "Lord," which appears to me a more probable reading. Lord of the Yavan or Greeks.

14. Rám Suha, his son.
15. Runsoor, his brother.
16. Run Sing, ditto.
17. Ruttun Syne, ditto, imprisoned by Sooltán Julalood-deen.
18. Indurjeet, in Sunbut 1688.
19. Runjeet.
20. Bír Singh.
21. Bharut.
22. Raja Maun Singh.

It would not however, suit the limits of a preface to pursue the question further. If the suggestions be sound, they will be taken up by men of greater erudition, who have leisure and the means of reference to books. I would however observe that bare lists of sovereigns, extending back four or five thousand years, without a single incident of history, or a hint by which to test their accuracy in comparison with parallel events in the history of the world, can be valuable only, when consonant with known phenomena. That nothing is more easy than to fabricate such lists and that nothing can be more probable than that bards and priests should fabricate them in support of their own theories and for the gratification of the vanity of those in power.

Let us now turn our attention to the favourite hero of the Punjaub Raja Russaloo son of Sala Byne or Salbyn or Salivahana, whose capital was Sialkót, one of the oldest cities of the Punjaub, held by the Pooroowar dynasty. I have in a former number of the Asiatic Journal offered a list of the Rajahs of Sialkót as recorded in a MS. which I there procured, I offer it again for convenience of reference.

	Rajas of the Pooroo-warr family who have reigned at Sialkôt, and their successors.	Traditional length of reign.	Dates given by the foregoing column.		Dates reckoning 22 years to each reign.	The same calculated backward from Maimood of Ghuzni.	
			A. D.	A. D.				A. D.
	Brumh to Sálábyn, 137,.....	2000					
1	Sálábyn from Sunbut, 137,.....	90	81	81	546	Ascended the throne 137 of Vikramaditya.	
2	Russaloo, his son,	45	171	103	568		
3	H ôdi,	52	216	125	590		
4	Burjial,	62	268	147	612		
5	Jypaul,	72	330	169	634		
6	Munnipaul,	62	402	191	656		
7	Mookundurpaul,	57	464	213	678		
8	Biddehpaul,	38	521	235	700		
9	Kishenpaul,	59	559	257	722		
10	Bynepaul,	92	618	279	744		
11	Kusspaul,	62	710	301	766		
12	Runjeetpaul,	88	798	323	788		
13	Runbeerpaul,	34	886	345	810		
14	Dunpaul,	53	920	367	832		
15	Urjunpaul,	49	973	379	854		
16	Luchmipaul,	79	1022	401	876		
17	Goorditpaul,	46	1101	423	898		
18	Diapaul,	63	1147	445	920		
19	Soorutpaul,	48	1210	467	942		Here ends the Rajpootre dynasty.
20	Sunnuupaul,	47	1258	489	964		
	Ferokhmah,	35	1305	511	986	Died A. D. 1030.	
	Maimood of Ghuzni, ..	9	1340	533	1008		

The columns added to this list of kings will show at a glance the points in which it is open to question. Calculating twenty-two years to each reign the entire list brings us to the death of Sooltan Maimood of Ghuzni in A. D. 565 instead of A. D. 1030, showing a discrepancy of 465 years. Pundits defend this by saying that under the name of each monarch we are to understand the entire dynasty. But this will not bear the light; for not only is each (in the copy I possess) styled the son of his predecessor; but a succession of twenty dynasties in the space of 1198 years is a phenomenon without precedent. It may perhaps be more correct to infer that the names of remarkable sovereigns alone have been recorded.

That the Salabyne of Sialkôt and the Salivahana whose era is current in the Indian Peninsula are identical admits of no doubt; for the assigned dates of their respective reigns agree within three years. Salivahana being, according to Elphinstone, A. D. 78 and Salabyne according to my MS. 81.

We may therefore with some security adopt the traditionary era of Russaloo, son of Salivahana, as A. D. 171, or the 453rd year after the conquest of the Punjab by Alexander. This was about the era of the introduction of Boodhism into the Punjab; to judge by the coins found in topes.

Those topes, in the traditions of the country are always associated with the great enemy of Russaloo, viz. the Rakuss. Upon the Bullur Tope he is said to have sat. Raja Srikup the other enemy of Russaloo is associated in tradition with the Tope of Maunkyala and has a tope of his own near the ruins of his palace in Pukli. The contests therefore of Russaloo with the Rakuss may figure the strife between two religions; the Boodhist faith on the one hand, and the Hindoo or the Christian* faith on the other. Or it may denote merely the struggle of two distinct races, the Hindoo and the Scytho-Greek.

The Rakuss, Rakush or Rukshasa, is represented as a gigantic monster in the human form, having a certain degree of command over the elements, but amenable to death in a violent form. The number of the race is variously recorded; but the most general tradition gives four brothers and a sister. Their chief haunts were Gundgurrh and Aooli of Huzara, but they brought upon themselves the vengeance of Russaloo by their depredations at Lahore, then called Oodinugri. Establishing themselves in the forest westward of that city, they daily demanded a human victim to be devoured by them. Russaloo's battles with these monsters, are the most favourite theme of the bards of the Punjab.

As in Persian history the white Scythian invaders of the empire are believed to be figured under the type of the Deeve Sofaid or white Demon, so the introducers of a creed, monstrous in the eyes of Bráhmans, may have been held up to detestation under the title and attributes of the Rakuss. That the Grecian colonists of the Punjab were eventually converted to this creed we have reason to believe from the continuance of Grecian inscriptions upon the coins of the country, after the appearance upon them of Boodhistic emblems.

* See, farther on, Salivahana's connection with emblems of the Christian religion.

The size of Russaloo's foes is no doubt enormously exaggerated; but it seems to me that the tradition of their gigantic stature, may have had some foundation in fact. For a coin* is common in Huzara and the trans-Indus territory, which must have been struck by some king almost coeval with Russaloo, having on one side the figure of a giant astride upon an elephant, which shrinks to a mere pony beneath him; he being astride not upon the neck, but upon the back of the elephant—a posture impossible to a being of human bulk. The reverse is sometimes a figure of Ceres, or of plenty, with the cornucopia. At others, it is that of a man who has just struck with one fist, and has drawn back the other to repeat the blow. This figure is also probably intended to represent a giant. At other times the reverse exhibits the four-armed figure occurring upon some of the coins of Kanerki. At others it is a figure facing the East and either sacrificing or obtesting. At other times it is a giant leaning on a trident. The legend, which is always in Greek characters, is seldom legible, owing partly to the character having become barbarised, partly to the effects of weather upon the copper: but more especially to the discordance between the Greek character and the foreign name or word recorded.

Upon one in my possession however I can distinctly decipher the word or name Αλοολι, Aloomi, which, as above stated, is an old mountain site in Huzara, a reputed haunt of the Rakuss, where according to some of the traditions, one of the monsters was slain by Russaloo. This site was very possibly named after the king or ruler who struck the coin in question. The elephant-strider is most probably his image.

This choice of a site in the mountains so strong as that of Aloomi, denotes that the plain was not safe for him, and is in keeping with the whole tradition of Russaloo's contests with the Rakuss.

The coin belongs to the Scytho-Greek series, and appears to follow immediately after those generally attributed to Baraoro, if we may judge by the types and execution. The name Rakuss is claimed by Sanscrit scholars as a corruption of Rukshasa. But I know no reason why the Hindoos may not have borrowed it from the Greek verb “*ῥακῶω*” (to rend, tear), or why it may not be com-

* See Nos. 1, 2, 3, 4, 5, 6, 7 of the Plate.

pounded of the Persian words *را* and *کشیدن* or *کشدن* the dragger or murderer of the highway. In one of the coins of the preceding series, if indeed it belong not to the same era, is the wild figure of a man, casting what appears to be a net. This method of entangling an enemy was known to the ancients: and the Thugs long had the credit of practising it upon their victims.

The elephant-strider coin appears to me to belong to several successive reigns, the type gradually growing more barbarous. This would be the case whether the image represented were the figure of the reigning ruler and his gigantic descendants, or whether it were that of a monster slain by the founder of the dynasty. The strider of the elephant bears sometimes a spear in rest, sometimes only the Ankoh or iron-hook used for driving the elephant, he has the fillets of royalty and sometimes what appears to be a horned helmet. The figure in reverse, burning incense or obtesting, wears top boots and an English hunting-coat buttoned. Sometimes he wears a turban. The figure of the reverse leaning upon a trident is naked to the waist; after which appears the dhotie of Hindustan, a single cloth hanging in profuse folds about the loins. There is nothing in these coins savouring of Buddhism, excepting the place they seem to hold in the Buddhistic series. The characters are Greek. The head-dress is Persian, the coat and boots are of Europe not of Tartary. The trident* which oriental scholars are so fond of attributing to Sheov, although he stole it from Neptune, is essentially Greek; as is the figure of Ceres with her cornucopia. The language most nearly approaches to the ancient Persian. The frequent occurrence of Ra seems to allude to the Ra of Egypt; the sun-god worshipped there, throughout Persia and eastward to the Jelum, and taken up in Hindustan under the slightly modified name Rám. On some of the coins Ardôkro may be almost decyphered. In the Ceres type occurs the word Agôthl or Agothkhr if I read aright the barbarised characters ΑΓΩΘΑ (the rest defaced) ΑΓΩΘΧΡ. On another type appears the word POAO or ROAO.

* The trident first appears in coins of Mauas or of Azas, when it serves for sceptre to the King who, as Neptune, stands upon the ocean, his right foot resting on his submerged foe. All succeeding appearances of the trident must be regarded as derived from this type.

The series of coins which commences apparently with the reign of Kadphises and of which specimens are generally found in topes, have all the same characteristics ; they are rather Greek than Asiatic, rather Persian than Tartar, rather belong to the religion of Zerstoot than to that of Buddhâ. The inscriptions are in the Greek character. We have full length figures of Hercules, denoting Hera-clean descent, which Alexander boasted in common with many Greeks. We have his club, denoting the same consanguinity.* We have the trident of Neptune, the especial deity of the Greeks, who were no doubt as proud as are Britons of their empire of the deep. We have the figure of Europa seated upon an Asiatic Bull to represent the union of Europe and Asia in this line of kings ; and we have the incense altar of Greece, upon which Alexander delighted to burn incense whenever he crossed a river or captured a fort, or entered a considerable city ; and we have the cornucopia in the grasp of Ceres.

On the other hand, the names or words recorded in Greek characters savour often rather of the ancient Persian, and of the deities worshipped by that race, as if the close intercourse of centuries and intermarriage with Persians had influenced the religious tenets of the Arianian kings. Such are the words Mithro, ΜΙΘΡΟ Athro, ΑΘΡΟ, Okro or Ardokro, ΑΡΔΟΧΡΟ, Korano, ΚΟΡΑΝΟ, the last being probably derived from the Pehlivi name of the sun *حور* which gives name to the provinces of Khorussaun and of Khorism. Whilst ΗΑΙΟC Helios, the Greek name of the sun, has the same reference with all the foregoing, to the worship of that luminary and of his element fire.

* *Ἐν τε αὐτῇ τῇ Ἰνδῶν γῆ* (he has just been speaking of Mount Meros) *βοῦς ῥόδοντας ἐγκεκαυμένας ῥόπαλον, τεκμηριούσθαι ἐπὶ τῷδε, ὅτι Ἡρακλῆς ἐς Ἰνδοῦς ἀφίκετο.* Arrian, lib. v. cap. 3.

Τῶν δὲ κοινωνησάντων αὐτῷ τῆς στρατείας ἀπογόνους εἶναι τοὺς Σίβας σύμβολα τοῦ γένους σώζοντας, τό, τε δορὰς ἀμπεχέσθαι, καθάπερ τὸν Ἡρακλέα καὶ τὸ σκυταλιφορεῖν, καὶ ἐπικεκαῦσθαι βουσί καὶ ἡμίονοις ῥόπαλον. Strabo. lib. xv. p. 688.

It is curious that the cypher of the Sikh Government stamped upon their public cattle, was not exactly a club, but a trident (trisul) which seems to have come down from the Greeks to them as an emblem of sovereignty. Their turban also is moulded into the Greek helmet ; and like the Spartans, they are sworn to arms.

Nevertheless the appearance of these coins in Buddhistic topes renders it highly probable that Buddhism had been extensively adopted when those coins were struck, and leaves not a doubt that it prevailed whilst the coins were yet current.

If we go back to the first coin of the Scytho-Greek series, that of Kadphises, it is impossible to resist the conviction that it was the work of fire-worshippers. In many of the golden coins, the principal figure has a pyramidal helmet, i. e. a helmet shaped like a flame of fire, and a flame of fire issues from the helmet. A flame also rises from either shoulder. He is pointing down to an altar and looking up, sometimes with the left arm akimbo, at others resting it upon a trident, and manifestly demonstrating the necessity of the worship he inculcates. His features are Turkish, his dress is that of Bokhara, and Bulkh the land of Zertoosht, when indeed he is not clad in Grecian mail. He has the club of Hercules denoting Heracleian origin, and the trident, as descendant of the rulers of the waves. He has sometimes* the Ram's horns as Amun Ra or Amun Helios, not of Egypt but of Greece.† These horns appear in old coins of Alexander, but were not adopted by any of his successors in Ariana. Upon the coins are the legends ΒΑΣΙΛΕΥΣ ΟΟΗΜΟ ΚΑΔΦΙΧΗΣ. ΒΑΣΙΛΕΥΣ ΒΑΣΙΛΕΩΝ ΜΕΓΑΣ ΟΟΗΜΟ ΚΑΔΦΙΧΕΣ. ΒΑΣΙΛΕΥΣ ΒΑΣΙΛΕΩΝ ΩΤΗΡ ΜΕΓΑΣ ΟΟΜΗΝ ΚΑΔΦΙΧΗΣ. ΚΟΓΣΟ ΚΟΖΟΥΑΟ ΚΑΔΦΙΖΟΥ.

But it is certainly not the figure of Kadphises that is sacrificing. For we have the head of that monarch upon other coins exhibiting purely Greek traits, and not at all resembling in any particular the full length portrait.

It seems to me highly probable that the full length figure represents Zertoosht, and that Kadphises introduced the system of that sectarian into his dominions. There is as yet nothing savoring of the Buddhistic doctrines. But they seem to have sprung out of

* See No. 9, of the Plate.

† The Greeks seem to have been mistaken in attributing the ram's head to Amun. It more properly belonged to Kneph. But they could not have fallen into this error unless the two Deities had been in their day confounded together by the Egyptians themselves. See Bunsen.

the worship of fire, or to have rapidly succeeded. For before the types of this series of coins are quite effaced, we find the king flourishing, in lieu of a sceptre, the Buddhistic rattle.

It is I know the fashion to consider Kadphises as a barbarian, i. e. an Asiatic and not a Greek. But this surmise appears to me to have little foundation, Greek could never have been the language of Ariana, for we have almost no traces of its existence in the dialects of the Asiatic provinces of that empire. It could have been only the court language, and must have been unintelligible to the mass of the people. Why then should Kadphises, if not of Grecian descent, have adopted it? and why should he have clung with such tenacity to Grecian emblems? It is highly probable I think that he was of Greek descent, born in Bactria or its neighbourhood, and that he conquered Cabul and the Sind Sagur Doab. In that case he might naturally have dropt the Pali, as being unintelligible to him, and have preserved only the Greek characters in his inscriptions.

Then follows the question, What is the origin of Buddhism? Is there any monument of that worship which can with certainty be traced to a period antecedent to Christianity? Are we not justified in regarding Egypt and Assyria as the nurseries of the worship of fire, with which was associated the doctrine of the good and the evil principle? Are we not justified in considering the pyramids as the original type of totes and dagobas of whatever kind? If the latter surmise be sound, the course of Buddhism was from North-West to South-East and the earliest totes are those of Cabul. Yet from none of these totes have coins been found of earlier date than the second century of our era, although Sakhya Muni the supposed founder of Buddhism, is generally believed to have flourished three or four centuries before Christ, and although in the 7th century, the Chinese traveller Hiang Tsang mentions dagobas at Julalabad and Peshawur built by Asoka, who is supposed to have reigned in the third century before Christ.

When the doctrine of Christ was first preached to the world, the prevalent eastern philosophy was that of the Gnostics, which pervaded Egypt and Syria, and being closely allied to the religion of the Magi, was probably also prevalent throughout Persia. We need

only to lay side by side the doctrines of the Gnostics and those of the Boodhists, to be convinced that they have a common origin, or that the one is derived from the other.

According to the Boodhist, *Adi Budha*, the supreme, self-existent God, infinite, eternal, without members or passions, dwelling in unbroken peace and in unbounded happiness, conceiving the desire to create, brought into existence five *Dhyani Boodhas*, or Divine intelligences, each of whom produced a son or *Boodhisatwa*. These were the actual creators of the universe, its preservers and destroyers.

The soul is part of the essence of *Adi Boodha* or the Almighty, allied to the material creation by misfortune and error. (How misfortune or error could happen to the Almighty is not explained.)

Adi Boodha although acknowledged as God, is never worshipped.

By abstinence from evil and meditation upon God, the soul is at length freed from its union with the flesh, and reunited to the Almighty.

There is a heaven for those who free themselves from the evil.

A hell for those who remain unfreed.

According to the Gnostic. The supreme self-existent God, infinite, eternal, without members and without passions gave forth a succession of emanations from himself called *Æôn* (*Αων*.) These acting upon matter which was eternal, but lay in a state of chaos, reduced it to order, and thus the universe had being. The *Æôn* who effected this was the *Demiurgos*. As Lord supreme of matter, he is at variance with the supreme spirit; and it is the triumph of spirit over matter which is to restore the spiritual nature of man to the *Pleroma* or heaven of the Almighty spirit.

According to the *Manichæans*, a branch of the Gnostics, *Manes* (perhaps the *Munnoo* of the Hindoo and the *Mani* or *Mooni* of the Boodhist) was the Comforter promised by our Saviour, when he left his disciples in despair at his loss. The *Boodha* closely assimilates to this character. He was a messenger from heaven. Not a God. Nor yet a mere man. A comforter and a teacher—but not an object of worship. The Hindoo *Pundit* if asked to describe the *Munnoo* says, “The *Munnoo* is neither God nor man. He appears from time to time and by him the universe is held together. This is the

Manes of the Manichæans and the Mooni of the Boodhist, and of their common origin there can be little doubt.

Another remarkable circumstance is, that in the Punjaub a Boodhist priest is called Gnástic; a name so peculiar and so underivable from any dialect of the country, that there is some ground for believing it to be identical with Gnostic.

One of the branches of the Manichæan heresy was that of the Aphites, whose Agatho Demon was the serpent: and the serpent was a type of the Saviour of the world—or according to some, *was* the Saviour.

Now according to tradition Sál Byne or Salivahana was son of a carpenter, and educated by a potter. His father, the carpenter, was chief of a serpent tribe, called Tukshaka, who could at pleasure appear as serpents or as men. Vikramaditiya, king of India, hearing that a child should be born of a virgin, who should conquer him, sent forth an army to destroy the child. The child Salivahana, breathing life into an army of clay images which the potter had made to amuse him, sent them forth and conquered Vikramaditiya. His army, however, entering the holy stream of the Narbudda on their return, dissolved in the water.

“This* Salivahana appears in the Bûdhi Sutwa of Siam as the Devetat or great foe and persecutor of Boodha through his ten stages of existence. Salivahana under the title of Tukshaka was crucified by order of Boodha on an instrument resembling the cross. Others say that he was impaled alive upon a double cross and hurled into the infernal regions: but the picture representing this, exhibits blood upon the arms and legs as if from crucifixion.”

It is manifest that Salivahana† was in some manner connected

* According to Col. Low.

† Salivahana signifies the cross-borne. Hindoos however derive it from Shali, a winged-horse that could fly over the ocean, and Wahun a Rider: Rider of the winged-horse.

The following is the succession of kings of the Chundra-bunsi line according to Sanscrit records

Rana, king of the Dukkun or South, Maun Singh, his son, who reigned from Benares to the Dukkun.

with the Christian faith. That faith spread very early into India. The apostle Thomas is believed to have preached at the court of Gondofares, king of Ariana, as well as to the Indians of the coast of the Peninsula. It is certain also that Christianity in its purest form early overspread Persia. And the Chaldæan church (of which a remnant yet survives in the Koord Mountains,* and which from the purity of its doctrine was in all probability propagated in the first century of our era) has records of Bishops of Merve, Heraut, India, Tabaristan, Samarcund, Mawaralnahr, Kashgar, Toorkistan, Bulkh, Seistan and Pekin of China, and fourteen others who need not here be named.

It is therefore probable that Salivahana was a convert to the Christian doctrine, which seems to me more reasonable than to suppose him an imaginary personage, the personification in fact of the Christian faith in India. For the Hindoos of the Indian Peninsula take their era from his reign, and the traditions of the Punjaub are full of his doings and of those of his son Russaloo.

Again to quote the researches of Col. Low. The Aryya Raja is the same as Deva Twashta or Devetat, (i. e. Sala Vahana) who was crucified by order of Boodha, whilst Boodha's disciples are styled Araham.

Now as Boodha was contemporary with Salivahana according to the Siamese books: either those books are false or Boodhism arose in the first century of our era. As Christianity flowed down from the North-West into Persia, Ariana and India, so it is highly probable that with it would flow those peculiar doctrines of the Gnostics, which had distorted several sects of the church in Egypt, Syria and Persia. This may have been the foundation of Boodhism; and the rival doctrines being preached to the same people at the same moment, would have become inveterately opposed the one to the other.

Salivahana or Sahl Bahn reigned from the Jelum to Cape Comorin; Poorun, his son, did not reign.

Russaloo, son of Salivahana, reigned in the Punjaub, and with him closed the line, he dying childless.

* See Layard's *Nineveh*, vol. 1st, chap. viii. This Church seems to have been protected so long as the reign of the Khaliph's lasted. The Toorks their successors persecuted and almost annihilated the Church.

Salivahana may have been called the Aryya Raja from his authority extending into Ariana or Arya, of which we must remember that the Punjab (the Western half of it at least) from time to time formed a portion. Salivahana seems to have been master as far as Jullalabad beyond the Khyber.

Of the birth of Russaloo and of his early history there remain many fabulous traditions. His father from fear of him kept him whilst young in a subterranean apartment. It therefore does not follow that the son was of the same faith as the father. Russaloo may have been either a Christian or a Hindoo. But it seems probable that his foes, styled Rakuss, were Boodhists, whom as the persecutors and murderers of his father, he would naturally have hated.

One of the most remarkable points in the religion of the Boodhists is their monastic establishments of both sexes. Another is their use of candles and cows in their religious ceremonies. A third is their practice of hoarding up relics. In all these respects they resemble the Roman and Greek churches, and it becomes a curious enquiry, whether they derived these remarkable institutions and customs from Christian sects, or whether the Christian sects copied from them; or whether both borrowed from the Essenes, who appear to have at least practised Monachism previous to the institution of Christianity. It seems to me not improbable that the Manichæans may be the original founders of Boodhism. That Manes may be the type of the Mooni of the Boodhist and of the Munnoo of the Hindoo.

The great difficulty attending such a theory is the inscription upon the rocks of Girnar and Dhauli. If the Asoka who engraved these was the grandson of Chundragupta and not a subsequent king of the same name, Boodhism must have preceded Christianity. It is however no uncommon thing to find the same name recurring in the lists of Hindoo kings. Thus in the Raja Tarangini we have two Domodaras, three Gonardas, two Vibhichamas, two Sunkramas, two Vikramadityas, two Naras: there is also an Asoka who could scarcely have been the great Boodhist king. Moreover although the lists of kings make Asoka grandson of Chundragupta, these lists are not very worthy of dependence. Wherever the number of kings does not agree with the period, they are supposed to cover

in history, pundits explain it by the omission of kings, sometimes for their supposed delinquency, at others from their reigns having passed with little incident.

Certain it is, that no traces of Boodhism met the Macedonians in the Punjab in the sixth century before Christ. And Megasthenes who resided several years at the court of Sandracottos at Palibothra in search of all that was curious in the religion and customs of the Hindoos, seems to have been equally ignorant of the existence of Boodhism in the third century before Christ.

Antiochus the Great invaded India B. C. 103. Yet from that invasion flowed no knowledge of Boodhism into Greece or Syria, although according to Boodhist tradition the religion must have been instituted nearly 400 years. The earliest record we have of the existence of Boodhism in India appears to be that left by Fahian, the Chinese traveller, who in A. D. 412 represents all the Hindoo Princes, East of the deserts of India, as attached to the law of Boodha.

I have allowed myself to ramble from the immediate subject to which this is a preface, because the main use of all traditions is to throw light upon history; and this is done not only by the substance of the traditions themselves, but much more by the facts and suggestions we are led to, in endeavouring to elucidate them. It was thus in their search for the grand arcanum, that our fathers laid the foundation of the science of chemistry.

Of the original poem fragments only remain, and no Bard possesses more than a few of these. The Stanzas are sung to the accompaniment of the Citara, and the prose portions are rehearsed without music.

Specimens of the metre will be found at the end of the notes. It seems probable, that they are fragments of a complete traditional ballad.

(To the continued.)



Notes on the Iron Ore of Korana in the Jetch Dooab of the Punjab, with a Qualitative Analysis of the same, by ANDREW FLEMING, M.D. EDIN. F. R. S. E. Assistant Surgeon, 4th Regt. Punjab Cavalry.

In the Report of the Proceedings of the Asiatic Society of Bengal for February as published in its Journal No. 2 of 1853, there appears a letter from Major Baker, dated September 20th, 1852, forwarding, to the address of H. Piddington, Esq. for analysis, a specimen of an iron ore from the Hill of Korana in the Jetch Dooab of the Punjab, which had been sent to him by Lieut.-Col. Napier, Civil Engineer, Punjab, along with a memorandum on its locality &c. by W. Purdon, Esq. dated 11th November, 1852.

Having been the original discoverer of this ore during a hurried trip made in January, 1852, to the Korana Hills, in company with Lieut. Grounds, Indian Navy, to whom I pointed it out, and having satisfied myself at the time that the ore was one of good quality, I was not a little surprised to observe the remarks made on it and the results of its analysis by Mr. Piddington.

These induced me to believe, that something very different from the Korana ore, had been sent by mistake, as the results of a qualitative analysis of the ore, which I have just made, amply prove.

Mr. Piddington, in his report of his analysis,* does not give the physical characters of the specimen examined, but remarks it has the appearance of a "rich carbonate of iron," than which nothing can be more dissimilar to the true Korana ore. The results of his analysis, appear to me to be such as would be obtained, from the examination of a ferruginous kunkur (calcareous tufa).

A specimen of the true Korana ore was forwarded by me to the Asiatic Society of Bengal marked No. 71, along with a collection of geological specimens from the Punjab, on the 26th October, 1852, and to it, I beg, those interested will refer.

The ore is of a dark brown, almost black colour, and with a satiny submetallic lustre. Its specific gravity is high and its streak reddish brown. Heated in a matrass it gives off water.

* See Asiatic Society's Journal, No. 2 of 1853, page 208.

In powder it does not effervesce with hydrochloric acid, but partially dissolves, the solution acquiring the characteristic brown-yellow colour of perchloride of iron.

A portion, finely powdered in an agate mortar, was digested in aqua regia, and evaporated to dryness. Water acidulated with aqua regia was then added, and the solution separated by filtration from a small insoluble residue of a dark-brown colour, apparently undecomposed ore (A).

To the filtered solution ammonia in slight excess was added, which caused a copious precipitate of peroxide of iron (B). This was separated by filtration, and the filtered liquid tested in the usual way for lime and magnesia, but without discovering a trace.* Hydrosulphate of ammonia did not indicate the presence of manganese.

The precipitate (B) was re-dissolved in an excess of aqua regia, the solution cooled as well as the weather would permit, treated with carbonate of soda and well stirred during effervescence.

The peroxide of iron precipitated was then separated by filtration and the clear solution boiled with a slight excess of carbonate of soda. No trace of manganese however could be detected.

The portion of ore (A) insoluble in acid was fused with carbonate of potash in a platinum crucible, and the resulting brownish slag treated with aqua regia. It dissolved entirely, with the exception of a few flakes of silica. The solution was then evaporated to dryness, redissolved in acidulated water, filtered to separate silica, and from the clear solution I precipitated the remaining peroxide of iron in the usual way, testing the solution filtered from it for lime and magnesia without detecting any.

From the above it is evident that the only constituents of the ore are—

Water.

† Peroxide of iron.

Silica.

* In the specimen analyzed by Mr. Piddington he found 65.14 per cent. of carbonate of lime (limestone).

† Not having any caustic potash nor material for preparing it available, I was unable to ascertain if any alumina occurred in the ore. From the appearance of the precipitated peroxide of iron, we should say it is absent or nearly so.

It is in short the limonite or brown hæmatite iron ore of mineralogists, on which Dana remarks as follows :

“Limonite is one of the most important ores of iron. The pig iron from the purer varieties, obtained by smelting with charcoal, is readily convertible into steel.”

It generally contains from 1 to 10 per cent. of silica which in the Korana ore is not in large quantity.

At present the weather is so hot and I have so little convenience for performing analysis, that I am unable to make a quantitative determination of the constituents of the ore, which, I believe, will be found to yield about 80 per cent. (probably more) of peroxide of iron, a quantity equivalent to fifty-six of metal.

Having given a general account of the Korana Hills and of the mode of occurrence of the iron ore in my late report to Government on the mineral wealth, &c. of the Salt Range and its dependencies, I need not here enter into further detail. I may remark, however, that as I could only devote one day to the examination of the locality, I can give but little positive information as to the quantity of ore likely to be found. At one spot the mass or vein of it appeared to be of considerable extent. If it should be found to occur in large quantity in all the quartz veins throughout the different ridges forming the Korana Hills, the thick jungle in their immediate vicinity would afford abundance of charcoal with which to smelt the ore, and limestone as a flux could be brought from the Salt Range, if kunkur, which is no doubt to be found near at hand, would not answer.

We very much doubt however if iron could be manufactured in the Punjab, at a cheaper rate than English iron can be supplied.

It is not improbable that manganese ore (peroxide of manganese) in workable quantity may also be found at Korana, as on our visit there I also discovered and obtained unmistakeable specimens of this valuable mineral, one of which marked No. 72 was forwarded to the Asiatic Society in the collection above referred to.



Literary Intelligence.

(Communicated by DR. A. SPRENGER.)

Hájy Mohammad Hosayn, the best publisher in India, has come from Lucnow to Calcutta with a view of establishing here a printing office (he is going to found new type) and a lithography for publishing Arabic and Persian works. The first books which he intends to publish is the Tafsyr of Nayshápúry and the Áyyn Akbary.

The following books have lately been printed :

تحفة الاخيار ترجمة مشارق الانوار

Present to the good, being a Hindoostanee translation of the Masháriq alanwár by Khorram 'aly in 1249. Beginning

الحمد لله . . . حمد اور نعت کے بعد دریاقت کیا چاہی

Lithographed Lucnow, Moçtafà press 1269, 2 vols. 8vo. 412 and 540 pp. with the Arabic text. This is the second edition.

کتاب فی اصول الفقہ المسمی الحسامی

Critic of the sources from which Laws are derived and on the manner in which they are derived by Hosám aldyn (this one of the texts on the subject read in schools).

Beginning

اما بعد حمد الله على نواله والصلوة على رسوله محمد واله فان اصول الشرع ثلثة

Lithographed, Delhi, very clear and with copious glosses, 1268, large 8vo. 184 pp.

معالم التذليل تأليف الحافظ محيى السنة ابو محمد الحسين بن مسعود البغوي

A commentary on the Qorán by Baghawy, the author of the Maçábyh. Beginning

قال الشيخ . . . الحمد لله ذي العظمة والكبريا والغرة والبقاء

Lithographed, Bombay (there is a blunder in the very title-page) 1269 large 4to. about 800 pages.

سلك مسلسل

Anecdotes, witty sayings, riddles composed in Urdu, in 1266, by Chanká Prashád, whose takhalluḡ is Jonún. Beginning

بعد حمد وافر و نعت متكاثر كي بنده كم استعداد

Lithographed, Delhi, 8vo. 1268, 30 pp.

مقامات حیددی

The celebrated Persian imitation of the Maqámát of Haryry, by the Qádhíy Hamyḍ Abu Bakr. Beginning

الحمد لله الذي شرفنا فالعلم الراسخ

Lithographed, Delhi 1268, large 8vo. with glosses 132 pp.

ديوان حافظ

The Dywán of Háfíz with a few glosses.

Lithographed, Delhi, 1269, 8vo. of 338 pp. I have not ascertained what text it is. Hájy Mohámmad Hosayn tells me that he is bringing out a carefully revised text with copious glosses founded upon four commentaries. This will be a most important publication.

جواهر القرآن

Lectures and prayers for every day in the week, consisting of passages selected from the Qorán by Imám 'alyy a son of Sayyid Najaf 'alyy of Agra. Beginning

دل میں تھا یہی کہ سب سے اول مضمون

Lithographed, Lucnow, Moçtafà press, 1268, small 8vo. 145 pp.

We learn from a letter of Professor Fleischer that the Saxon Government has purchased at Damascus a collection of Arabic MSS. for 70,000 Piasters. It contains about five hundred volumes on various sciences, and is to be deposited in the library of the university of Leifzig. Most of the books are written in a clear and legible hand, and some of them are of great age. The oldest bears the date of A. H. 380, and there are several MSS. among them of the fifth century. It contains a great number of historical works and of Journals. Professor Fleischer is preparing a catalogue of this valuable collection.



PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,

FOR JANUARY, 1854.

At the Anniversary General Meeting of the Asiatic Society, held on the 4th inst. at the usual hour,

Sir JAMES COLVILLE, Kt., President in the Chair,

The Secretary read the following report :

REPORT.

In presenting their annual report of Proceedings the Council have again occasion to congratulate the meeting on the actual condition of the Society, which, both financially and in respect of accession of members, is very favourable.

At the close of 1852 the Society numbered 139 members. Since that time it has lost three members by death and six by retirement, besides two whose names have been removed from the list under bye-law 13, for non-payment of subscription. There has however been an accession of eighteen new members, making the total number now on the Society's list 146, of whom 23 are absent from India.

Among the names of deceased members are those of the Hon'ble James Thomason and Major Markham Kittoe, both of them distinguished for the deep interest which they took in the prosperity and usefulness of this institution, and the latter a contributor to its Journal. The name of the other deceased member is Dr. F. Corbyn.

FINANCE.

The abstract Statement No. 1 annexed to this report, shews the receipts of 1853 to have been Rs. 19,933-13-7 which added to the sum of Rs. 3,762-6-10, the balance in the Society's favour at the

end of 1852 make a total income of Rs. 23,696-4-5. The total expenditure for the year has been Rs. 18,463-7-6, leaving a balance in favour of the Society, of Rs. 5,232-12-11. The gradual improvement of the different branches of the Society's resources will be best seen in the following statement.

	<i>Receipts in 1852, in 1853.</i>			<i>Disbursement, 1853.</i>		
Contribution,	Rs. 6,764	12 0	7,778	9 3	16 0	0
Library including Society's Oriental and other publications,	1,652	11 0	2,176	9 6	1,624	13 9
Journal,	1,074	4 0	816	4 0	3,496	5 0
Museum including Govt. Grants,	7,368	1 0	7,368	0 0	7,955	4 0
Building,	0	0 0	0	0 0	1,433	11 6
Secretary's Office.....	2	11 0	0	0 0	1,906	1 0
Deposits,	130	0 0	315	0 0	32	0 0
Miscellaneous,	34	5 6	0	0 0	302	0 3
	<hr/>					
Total,	17,026	2 6	18,455	2 9	16,766	3 6

The finance Committee have carefully examined the statement of outstanding assets, and at their suggestion, the council have removed from the account books, all such items as are not likely to be realized. The items thus removed amount to Rs. 4,186-5-11 and there are still a few which are doubtful of realization. The rest Rs. 8,210-3-5 however are certain of realization in course of this year.

The whole of the *liabilities* pressing or otherwise, including the estimated cost of the last three Nos. of the Journal not yet paid for, amount to 1,945-6-10, which deducted from the cash balance now in hand will, together with Rs. 884-14 in the hands of the London agents, leave at credit a clear disposable balance of Rs. 3,287-6-1.

This result will doubtless, the Council think, be acknowledged as satisfactory, especially when it is remembered that it has been arrived at after incurring heavy expenses for repairing and adding to

A Rs. 1,171-3-6. the buildings (A) and for illustrating the contributions (B) published in the journal.
B Rs. 1,506-4-0.

The following may be taken as a fair estimate of the probable income and expenditure of the current year.

INCOME.

Contributions from 123 Resident Members,	Rs.	7,872
Government Grants,		7,368
Journal,.....		1,000
Sale of Society's Publications,		2,200
Do. in England,		200
	Total,	<u>18,640</u>

EXPENDITURE.

General Establishment, Secretary's Office,	Rs.	1,470
Museum Establishment and contingencies,		7,920
Journal, say 7 Nos.,		1,800
Library including Rs. 1,000 for books,		2,250
Miscellaneous, including Building,.....		1,200
	Total,.....	<u>14,640</u>

LIBRARY.

Since the last annual Report, the Library has received an addition of 153 volumes, many of which are donations from authors and learned Societies. Successive grants, amounting altogether to Rs. 1,000, have been made to the Library Committee for the purchase of additional works. Glazed cases have been provided for the Persian, Arabic and Urdu MSS. and others are in course of preparation for the Sanscrit MSS. The Council recommend that the attention of their successors may be drawn to the propriety of still further strengthening the resources of this Department in the course of the current year.

The new Catalogue in a more useful form than that published in 1843, is in the press and, it is hoped, will be published soon.

MUSEUM.

This Department has been enriched by the acquisition of several valuable ancient coins and sculpture.

OFFICERS.

The Council have again to express their entire satisfaction with the manner in which the Librarian and the Curators of the two Departments of the Museum have discharged their duties.

JOURNAL.

Seven numbers of the Journal have been published during the year just closed. They contain a great variety of papers, many of which were placed at the Secretary's disposal by order of the Most Noble the Governor General of India, to whom the acknowledgments of the Society are due.

ORIENTAL GRANT.

Marked progress has attended the change made in the mode of publishing the Bibliotheca Indica; no less than twenty-two Nos. have been issued during the year under review. Of these 9 are Arabic and the rest Sanscrit, and they include portions of the following works.

1. The Uttara Naishada Charita by Sri Harsa, with the commentary of Náráyana, edited by Dr. Röer, Fasciculi V. VI. & VII. Nos. 46, 52, and 67.

2. Chaitanya Chandrodaya, or the incarnation of Chaitanya, a Drama in ten acts, by Kavikarnapura, with a commentary explanatory of Prakrita passages, edited by Bábu Rájendralál Mitra, Fasciculi I. II. Nos. 47, and 48.

3. Suyuty's Itqán or the exegetic sciences of the Korán. Edited by Moulavees Bashurooddin and Nurool Haqq, with an analysis by Dr. Sprenger, Fasciculi II. III. Nos. 49, and 57.

4. Taittiríya, Aittaréya, Swétas'watara, Kéna, Isa, Katha, Prasna, Mundaka, and Maṇḍukya Upanishads, translated by Dr. Röer, Fasciculus II. No. 50.

5. Sáhitya Darpaṇa or Mirror of Composition, a Treatise on Literary Criticism, by Viswanátha Kavirája, edited by Dr. Röer and translated into English by Dr. J. Ballantyne, Fasciculi III. IV. V. Nos. 53, 54, and 55.

6. Lalita-Vistara, or Memoirs of the life and Doctrines of Sákya Siṅha, edited by Bábu Rájendralál Mitra, Fasciculus I. No. 51.

7. Fotooh Al Sham, being an account of the Moslim Conquests in Syria, by Aboo Ismaail Mohummed 'bin Abd Allah al'azdid al Baçri. Edited by Ensign W. N. Lees, Fasciculi I. II. Nos. 56 and 62.

8. The Conquest of Syria, commonly ascribed to Aboo Abd Allah Mohammad B. Omar al Waqidi, edited with Notes by Ensign W. N. Lees, Fasciculi I. II. Nos. 59 and 66.

9. A Dictionary of the Technical Terms used in the sciences of the

Musalmáns, edited by Moulavees Mohammad Wajyh, Abd Al Haqq and Gholam Kader and Dr. Sprenger, Fasciculi I. II. Nos. 58 and 65.

10. Biographical Dictionary of Persons who knew Mohummed, by Ibn Hajar, edited in Arabic by Moulavees Mohummed Wajyh, Abdul Haqq and Gholam Kader and Dr. Sprenger, Fasciculus I. No. 61.

11. Tusy's List of Shy'ah Books and 'Alam alHoda's Notes on Shy'ah Biography, edited by Dr Sprenger, Fasciculus I. No. 60.

12. Sarvadersana Sañgraha ; or an Epitome of the different systems of Indian Philosophy, edited by Pandit Iswarachandra Vidyáságara, No. 63.

Among the works in progress, the Council would especially draw attention to an edition of the Black Yajur Veda, the only portion of the ancient Hindu scriptures which for want of MSS. no scholar in Europe has yet been able to undertake. It will complete the series now in the course of publication under the auspices of the Hon'ble Court of Directors by Messrs. Müller, Weber, Benfey and Roth. The Sanhitá portion is to be edited by Dr. Röer and the Brámanah by the Society's Librarian, Bábu Rájendralál Mitra.

Resolved on the proposition of the President, seconded by Mr. Houstoun, that the Report be received and adopted.

In compliance with the notice given at the December Meeting, the President also proposed that section 6 of the Bye Laws be modified by omitting the words "is anxious to promote the cause of science and Literature and." Hon'ble Col. J. Low having seconded the resolution, it was carried unanimously.

The meeting then proceeded to the election of office-bearers for the current year, and appointed Mr. Houstoun and Dr. Macrae Scrutincers, who announced the following to be the result of the Ballot.

PRESIDENT.

Hon'ble Sir J. W. Colvile, Kt.

VICE-PRESIDENTS.

Hon'ble Col. J. Low.

Sir H. M. Elliot.

Bábu Ramgopaul Ghose.

COUNCIL.

C. Allen, Esq.
Dr. G. G. Spilsbury.
Dr. Macrae.
Major Baker.
Captain Thuillier.
Rev. W. Kay.
Dr. Röer.
H. Woodrow, Esq.
H. Walker, Esq.

SECRETARIES.

Dr. A. Sprenger.
A. Grote, Esq.

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENT
OF THE
ASIATIC SOCIETY,
FOR
THE YEAR, 1853.

STATEMENT

Dr. *Abstract Statement of Receipts and Disbursements of the*

RECEIPTS.

To MUSEUM.

Received from the General Treasury, amount of Government allowance authorized by the Court of Directors for the services of a Curator, from December, 1852, to November, 1853, at 250 Rs. per mensem, ... Rs.	3000	0	0	
Ditto ditto for the preparation of Specimens of Natural History from ditto to ditto at 50 do.	600	0	0	
				<u>3,600 0 0</u>

To MUSEUM OF ECONOMIC GEOLOGY.

Received from the General Treasury, amount of Government allowance authorized by the Court of Directors for the services of a Joint-Curator, from December, 1852, to November, 1853, at 250,	3000	0	0	
Ditto for Establishment and Contingencies from ditto ditto, at 64,	768	0	0	
				<u>3,768 0 0</u>

To COMPOSITION FEE.

Received from Sir James Colville,	500	0	0	
				<u>500 0 0</u>

To CONTRIBUTION AND ADMISSION FEE.

Received from the Members amount of Quarterly Contributions,	7778	9	3	
Ditto ditto Admission Fees,	384	0	0	
Ditto ditto in Advance,	6	10	6	
				<u>8,169 3 9</u>

To LIBRARY INCLUDING SALE OF ORIENTAL PUBLICATIONS:

Received from Bābu Rājendralāl Mitra, Librarian and Assistant Secretary, by Sale of Miscellaneous Books, from January to December, 1853,	1351	4	0	
Ditto ditto at Benares,	433	0	0	
Ditto ditto by Sale of Bibliotheca Indica sold at the Library including Subscriptions to do.	306	6	0	
Ditto ditto by Professor Hall at Benares,	85	15	6	
Ditto ditto by London Agents, £ 24-12-3 or	246	2	0	
				<u>2,422 11 6</u>

To JOURNAL.

Received by Sale of the Society's Journal and Subscription to ditto from January to December, 1853,	0	0	0	816 4 0
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 Carried over, ... 19,276 3 3

No. I.

Asiatic Society, from the 1st of Jan. to 31st of Dec. 1853.

Cr.

DISBURSEMENTS.

BY MUSEUM.

Paid Mr. Blyth's salary as Curator, from December 1852 to November 1853, being 12 months, at Rs. 250,	Rs.	3000	0	0	
Ditto for House-rent ditto ditto at 40,		480	0	0	
Ditto for Establishment at 45 ditto,		540	0	0	
Ditto charges for repairing the Verandah of the Taxidermists' room,		1	3	0	
Ditto Contingencies for preparing Specimens of Natural History,		241	8	3	
					4,262 11 3

BY MUSEUM OF ECONOMIC GEOLOGY.

Paid Mr. H. Piddington's salary as Joint-Curator, from December 1852 to November 1853, being 12 months at 250 Rs. per mensem,	3000	0	0	
Ditto Establishment ditto ditto, at 35 ditto,	420	0	0	
Ditto Contingencies,	267	11	9	
				3,687 11 9

BY MUSEUM OF MINERALOGY AND GEOLOGY.

Paid Mr. H. Piddington, Curator, for Sundry Contingencies,	4	13	0	4 13 0
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BY LIBRARY.

Paid Babu Rajendralal Mitra's salary from December 1852 to November 1853, at 70 per mensem,	840	0	0	
Ditto Establishment at 8, ditto,	96	0	0	
Ditto Contingencies,	48	9	0	
Ditto for Binding Books,	225	11	0	
Ditto for Freight for Books dispatched to Benares,	23	5	9	
Ditto for Extra-writer for copying the Catalogue,	3	5	3	
Ditto for preparing Book-shelves,	140	6	0	
Ditto for printing Catalogue,	37	0	0	
Ditto for purchasing Books,	210	8	9	
Ditto for purchase of Books in London including duty, freight, &c. £37-10-6,	375	4	0	
				2,000 1 9

BY JOURNAL.

Paid Rev. J. Thomas, of the Baptist Mission Press, for Journal up to No. 4, of 1853,	1,861	8	6	
Ditto Sundry Draftsmen, Engravers, and Lithographers for Drawing, Engraving, &c.	1,505	4	0	
Ditto P. O. S. N. Company, freight for dispatching Journals to Europe,	89	5	0	
Ditto Contingencies,	40	3	6	
				3,496 5 0

Carried over, ... 13,451 10 9

Brought forward, Co.'s Rs. 19,276 3 3

TO SECRETARY'S OFFICE.

Received fine from Chuprassee's wages, ... 0 12 0 0 12 0

TO DEPOSIT.

Received from Sir James Colvile on account, ... 291 0 0

Received from J. Walker on account, ... 24 0 0

315 0 0

TO DADIBA PANDURANG, Esq.

Received from him (by transfer), ... 31 0 0 31 0 0

TO J. BENNETT, Esq.

Received from him (by transfer), ... 306 1 4 306 1 4

TO F. E. HALL, Esq.

Received from him on account, ... 4 13 0 4 13 0

Carried over, ...

19,933 13 7

Brought forward, Co.'s Rs. 13,451 10 9

BY BUILDING.

Paid R. Ghose, Esq. Collector, Assessment for the premises of the Asiatic Society from November 1852, to July 1853,	262	8	0	
Ditto H. M. Smith, Esq. for repairing the Society's premises, and building a new portico and a sky-light,	1,171	3	6	
				<u>1,433 11 6</u>

BY SECRETARY'S OFFICE.

Paid General Establishment from December 1852, to November 1853, at 86-8 per mensem,	1,038	0	0	
Ditto Secy.'s ditto from ditto ditto,	652	12	6	
Ditto Stationery, &c.,... ..	27	9	0	
Ditto Postage,... ..	128	6	0	
Ditto Petty Charges,	30	1	6	
Ditto for Printing and Lithographing Sundry blank forms,	29	4	0	
				<u>1,906 1 0</u>

BY DEPOSIT.

Paid for drawing on stone, in Chalk Style, a Monk's-head, on account of Mr. Hodgson,...	6	0	0	
Ditto for copying Sundry Books and purchasing papers on account of Lt. Raverty,	26	0	0	
				<u>32 0 0</u>

BY MISCELLANEOUS.

Paid Sundry Contingencies, charges for Meeting and oil for night-guard,	183	13	3	
Ditto for Advertising Meetings of the Society,	63	3	0	
Ditto J. Chaunce, for winding the clock,	25	0	0	
Ditto Messrs. Augier & Co. for repairing a bronzed lustre,	2	8	0	
Ditto Rev. J. Thomas, for executing Miscellaneous Works,	27	8	0	
				<u>302 0 3</u>

BY SIR JAMES COLVILLE.

Paid him (by transfer,)	791	0	0	791 0 0
				<u>791 0 0</u>

BY GOVERNMENT AGENT.

Paid him to purchase Government paper on account of the Society,	500	0	0	500 0 0
				<u>500 0 0</u>

BY DADOBA PANDURANG, Esq.

Paid him (by transfer,)	31	0	0	
				<u>31 0 0</u>

CONTRIBUTION.

Refunded M. J. Sandes, Esq. on account of H. Torrens, Esq. excess contribution for the 4 qr. 1852,	16	0	0	
				<u>16 0 0</u>

Carried over, ... 18,463 7 6

Brought forward, Co.'s Rs. 19,933 13 7

TO BALANCE.

As per account closed on the 31st December,

1852, Cash in hand and at the Bank, ... 2,748 6 10

Ditto with London Agents, £101-8-0, or at 21, 1,014 0 0

3,762 6 10

TO GOVERNMENT AGENT.

To a piece of Government paper as per contra, 500 0 0

500 0

Co.'s Rs. 24,196 4 5

Brought forward, Co.'s Rs. 18,463 7 6

BY BALANCE.

In the Bank of Bengal, ...	...	3,911	11	5		
Cash in hand, ...	...	99	11	5		
With London Agents £88-9-9 or,	...	884	14	0			
Invested in Government Securities,	...	500	0	0			
		<hr/>			5,396	4	10

INEFFICIENT BALANCE.

Due by H. M. Smith, Esq. ...	...	200	0	0		
Ditto, ditto Lieut. Raverty, ...	...	21	8	10		
Ditto, ditto E. Blyth, Esq. ...	...	82	2	0		
Ditto, ditto R. N. Cust, Esq. ...	...	1	8	0		
Ditto, ditto H. Templeton, Esq. ...	...	1	8	0		
Ditto, ditto Petty Charges for December,	...	29	13	3			
		<hr/>			336	8	1
		<hr/>			Co.'s Rs.	24,196	4 5
		<hr/>					

E. E.

(Signed)

RA'JENDRALA'L MITTRA,
Assistant Secretary.

STATEMENT

Dr.

The Oriental Publication Fund to

1853.—TO CUSTODY OF ORIENTAL WORKS.

Paid Bábu Rájendralál Mittra, his salary for the Custody of Oriental Works from December, 1852, to November, 1853, at 30 Rs. per mensem,	360	0	0	
Ditto Establishment for ditto	144	0	0	
Ditto Book-binding,	54	0	0	
Ditto Contingencies for ditto,	12	6	6	
Ditto Govind Mistry for three Glazed Cases,...	760	0	0	
Ditto Messrs. Lackersteen & Co. 8 Wrought Iron Clamps with screws, &c. for Book-shelves,	35	0	0	
	<hr/>			1,365 6 6

TO BIBLIOTHECA INDICA.

Paid Dr. E. Roër, his salary and Establishment for December, 1852,	0	0	0	161 14 0
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TO LALITA VISTARA.

Paid Bábu Rájendralál Mittra, editing charges on account,	42	0	0	
Ditto Rev. J. Thomas for printing No. 51, of the Bibliotheca Indica,	69	0	0	
	<hr/>			111 0 0

TO HISTORY OF CHINA.

Paid J. Corcoran, Esq. for 20 copies of the 2nd vol. of his Urdu History of China, per bill,...	0	0	0	240 0 0
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TO SA'NKYA PRAVACHANA BHA'SHYA.

Paid Agents of the Inland Transit Company hire on a parcel sent to Benares, per bill,	0	0	0	7 7 0
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TO DICTIONARY OF TECHNICAL TERMS.

Paid Moulouvie Mohammed Wajeel for postage per bill,	13	8	0	
Ditto ditto,	11	4	0	
Ditto Abdul Hoqq for copying MSS.	180	0	0	
Ditto Mohammadee for ditto,	14	6	1	
Chummu peon, his salary for 22 days of Oct....	1	9	6	
	<hr/>			220 11 7

TO BLACK YAJUR SANHITA.

Paid Dr. E. Roër on account,	165	0	0	
Ditto for Paper,	0	6	0	
	<hr/>			165 6 0

TO ITQUAN.

Paid Moneeruddeen for copying MSS.	12	0	0	
Ditto Rev. J. Thomas for printing Nos. 44 and 49, of the Bibliotheca Indica,	444	0	0	456 0 0

 Carried over,... 2,727 13 1

No. 2.

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Cr.

BY BALANCE.

In Company's Paper with Government Agent, ...	Rs. 7,000 0 0			
Cash in their hands,	... 1,077 15 10			
				8,077 15 10
Bank of Bengal, ...	... ..	...	1,397 15 3	
Cash in hand, ...	... ..	...	37 11 9	
			9,513 10 10	

BY GOVERNMENT GRANT.

Received from the General Treasury, being the monthly grant sanctioned by the Court of Directors from December, 1852, to November, 1853, being twelve months at 500 Rs. per mensem,	0 0 0	6,000 0 0
---	--------	-----	-------	-----------

BY LOAN.

Received from the Society's Cash,	6 7 11	
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	Brought forward, Co.'s Rs.			2,727	13	1
To KHIRD NAMEH ISKANDARY.						
Paid Rev. J. Thomas, for printing No. 43 of the Bibliotheca Indica, containing the first fasciculus of the above,	256	0	0	256	0	0
To PURCHASE of MSS.						
Paid Ensign Lees, for a copy of a Commentary on the Koran,	0	0	0	100	0	0
To CHAITANYA NA'TAK.						
Paid Bábu Rájendralál Mitra, editing charges on account,	100	0	0			
Ditto Rev. J. Thomas, for printing Nos. 47 & 48, of the Bibliotheca Indica,	435	4	0			
	<hr/>			535	4	0
To BIOGRAPHICAL DICTIONARY.						
Paid Abdul Ghani for copying MSS.	30	0	0			
Ditto Mohammadee for ditto,	5	13	1			
Ditto Golam Kadir for ditto,	35	0	0			
Ditto Keramut Ullah for ditto,	0	12	0			
Ditto Chummu peon, his salary for 22 days of October,	1	9	6			
Ditto Postage,	15	2	0			
	<hr/>			88	4	7
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Paid Rev. J. Thomas for Nos. 53-54-55 of the Bib. Indica,	666	0	0	666	0	0
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Ditto Dr. E. Roër, editing charges on account current,	315	13	0			
	<hr/>			1,653	13	0
To BLACK YAJUR BRA'HMANA.						
Paid Bábu Rájendralál Mitra, on account editing charges,	70	0	0			
	<hr/>			70	0	0
To BALANCE.						
Company's paper with the Government Agent,	7,000	0	0			
Cash with ditto,	1,077	15	10			
Balance in the Bank of Bengal,	817	0	3			
	<hr/>			8,895	0	1
To INEFFICIENT BALANCE.						
Due by Sariat Wollah Duftory,	20	0	0			
Ditto Petambur Paul,	263	0	0	283	0	0
	<hr/>					
				Company's Rupees,	15,520	2 9
					<hr/>	

1854.]

Proceedings of the Asiatic Society.

xi

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Company's Rupees, 15,520 0 1

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Abstract of Meteorological Observations for the month of May, 1853.

Rangoon, 1st June, 1853.

Thermometer Sunrise.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer Sunset.			Thermometer 9 P. M.			Remarks.															
Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.																
80.5	79	74.5	78.450	76.7d4		90	81		79	74.5	78.724	81.5	75.5	75	78.896	90.914	79.5	76.5	83.5	79	76.5	91.130	79.5	83	77	75	78.4	88	82	75	74	81.281	77.388
30.094	Maximum.	Min. of pre- ceding ob- servations.	30.10	Maximum.	Min. of pre- ceding ob- servations.	30.09	Maximum.	Min. of pre- ceding ob- servations.	30.0d	Maximum.	Min. of pre- ceding ob- servations.	30.0d	Maximum.	Min. of pre- ceding ob- servations.	30.0d	Maximum.	Min. of pre- ceding ob- servations.	30.0d	Maximum.	Min. of pre- ceding ob- servations.	30.0d	Maximum.	Min. of pre- ceding ob- servations.	30.0d	Maximum.	Min. of pre- ceding ob- servations.	30.05	Maximum.	Min. of pre- ceding ob- servations.	30.05	Maximum.	Min. of pre- ceding ob- servations.	
d9.91	Minimum.	d9.815	d9.781	Minimum.	d9.94	Minimum.	d9.8d7	Minimum.	d9.80	Minimum.	d9.717	Minimum.	d9.8d7	Minimum.	d9.80	Minimum.	d9.761	Minimum.	d9.80	Minimum.	d9.774	Minimum.	d9.774	Minimum.	d9.89	Minimum.	d9.761	Maximum.	d9.80	Minimum.	d9.774	Minimum.	
No instru- ment.																																	

J. FAYRER, M. D. Asst. Surgeon,
Field Hospital, Rangoon.

The weather this month has been un-
settled, cloudy and frequently wet ;
squalls of wind and rain with light-
ning at sunset and during the night.
Prevailing winds in early part of the
month in the mornings W. N. W.
S. W. or W. S. W. in the afternoon.
Latterly prevailing in the S. W.
Up to sunrise of 1st June, 80.4 inches
of rain fell.

Date.	SUNRISE.										9 A. M.										NOON.									
	Thermometer.		Mer- cure.	Force and direction of Wind.	Aspect of Sky.	Rain.	Thermometer.		Baro- meter.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Baro- meter.	Force and direction of Wind.	Aspect of Sky.														
	Wet.	Dry.					Wet.	Dry.				Wet.	Dry.				Wet.	Dry.												
1	77	79	29.72	W.N.W.lt.	Clear.	..	78.5	89.5	29.80	W.S.W.f.	†	78	99	29.80	W.S.W.f.	Cumuli.														
2	78	80	29.78	Ditto	Ditto	..	79	90	29.85	Ditto lt.	Ditto	80	97.5	29.82	S.W.do.	Ditto														
3	77	79.5	29.80	Ditto	Ditto	..	79	88	29.864	W.S.W.f	‡	79	98	29.78	S.W.lt.	Cumuli.														
4	76	78.5	30.79	Ditto	Ditto	..	78.5	89.5	29.822	S.W.f.	Clear.	76	99	29.822	W.S.W.lt.	Scat.lt.cum.														
5	76	78.5	29.72	Ditto	Ditto	..	77	87	29.83	W.S.W.lt	Cumuli.	77.5	97.5	29.83	w.s.w.std.	Ditto														
6	75.5	79	29.78	Caln.	Foggy.	..	78	85	29.84	Ditto	§	76.5	97.5	29.84	Ditto	lt fleecy c.														
7	76	78.5	30.27	Ditto	Lt. cirri.	..	78	87.5	29.90	Ditto	Ditto	78	97.5	30.77	Ditto	Ditto														
8	75.5	78	29.77	....	....	..	78.5	85.5	29.84	Ditto	||	81.5	96.5	29.763	S.W.fog.	Ditto											
9	..	74.5	29.77	....	Clear.	0.56	77	84	29.81	S.W.lt.	Clear.	78.5	90	29.82	S.W.[able.	Do. strati.													
10	74.5	77.5	29.81	....	....	0.22	78	82	29.81	S.lt.	Cly. & cl.	78.5	90.5	29.81	N. change-	Ditto												
11	78	80	29.78	W.S.W.	Cum.-st.	..	79	85.5	29.84	S.W.lt.	Clear.	79	95.5	29.792	S.by E.do.	Ditto														
12	76	78	29.72	S.b.W.lt.	Cumuli.	..	77.5	83	29.78	Ditto	Ditto	78	95	29.75	S.W.lt.	....													
13	77	79	29.72	....	Clear.	..	79.5	85	29.78	Ditto	Ditto	81	76	29.74	Ditto	Sirri.													
14	76.5	79	29.72	....	....	..	79	83.5	29.76	Ditto	Cirri.	77.5	97	29.75	S.by E.lt.	Cum. hazy.											
15	78	80.5	29.71	....	....	..	79	84	29.77	Ditto	Ditto st.	81.5	96	29.74	N.W.lt.	....													
16	..	74.5	29.71	....	....	1.80	..	..	..	....	....	..	..	..	Ditto	....													
17	74.5	75	29.71	N.W.lt.	....	1.20	71.5	75	29.76	N.E.lt.	Strati.	75	73.5	29.71	Ditto	Strati. Rain.													
18	75	75.5	29.69	Ditto	....	..	76	77	29.72	N.W.lt.	Ditto	77	78.5	29.70	Ditto	Ditto												
19	74.5	76	29.70	Ditto	....	1.70	79	81.5	29.75	Ditto.	Cumuli.	80.5	89.5	29.752	Ditto	Cumuli.													
20	78.5	80	29.74	Caln.	....	0.05	79	86.5	29.81	Ditto.	Ditto	79	85.5	29.79	W.N.W.lt.	Cirro-strati.													
21	78.5	80	29.788	Ditto	....	..	80	85	29.822	W.S.W.	Cumuli.	80	91.5	29.82	....	Cumuli.											
22	78	79.5	29.81	S.W.lt.	Cirri.	..	80	85.5	29.87	Ditto	Ditto	79	92	29.84	Ditto	A few scatd.														
23	78	79.5	29.821	Ditto	Ditto	..	81	86	29.87	Ditto	Ditto	80	90.5	29.856	W.S.W.lt.	.. [cum.														
24	79	80.5	29.81	Ditto	Cirri-st.	0.05	81	83.5	29.85	Ditto	Ditto	82	89	29.84	Ditto	Cum. strati.														
25	77	78.5	29.82	W.S.W.lt.	Ditto	0.05	80	83	29.88	Ditto	Ditto	78	80	29.84	Ditto	Ditto														
26	77	78	29.78	Ditto	Ditto	0.05	79	80	29.82	S.W.lt.	Strati.	77	79	29.78	W.N.W.lt.	Strati. Rain.														
27	76	77	29.74	Ditto	Ditto	0.35	79	81	29.80	Ditto	Cumuli-st.	..	..	..	Ditto	Ditto											
28	77	79	29.76	Ditto	Cirri-cum.	0.06	80.5	81.5	29.80	Ditto	Cr.-cumuli	81	90	29.78	Ditto	Cumuli.														
29	77	79	29.79	Ditto	Ditto	..	78.5	83	29.82	Ditto	Ditto	81	90	29.89	Ditto	Ditto														
30	76.5	77.5	29.88	S.W.lt.	Cumuli-st.	1.10	..	..	..	....	....	80	85	29.78	W.f.	Ditto									
31	77	78	29.74	W.S.W.lt	Cirro-st.	0.05	80	82	29.80	Ditto	Ditto	78	81	29.77	Ditto	Cum. strati.														
Total.	222.5	233.5	894.452	....	....	7.21	228.3	2442.5	863.628	....	....	223.8	2656.5	864.985	....	....												
Mean.	76.794	78.45	29.815	....	....	..	78.721	84.224	29.781	....	....	78.8966	90.914	29.827	....	....												

3 P. M.			SUNSET.			9 P. M.			Remarks.		
Wet.	Dry.	Barometer.	Force and direction of Wind.	Aspect of Sky.	Wet.	Dry.	Barometer.	Force and direction of Wind.		Aspect of Sky.	
79	101.5	29.73	S. W. lt.	Cumuli.	..	..	29.58	S. W. lt.	Clear.	a
80	100	29.75	S. W. steady.	Ditto	..	..	.79	W. N. W.	Clear steady.	b
78	101.5	29.74	S. W.	Ditto	..	..	..	..	..	c
..	..	..	..	..	..	..	..	..	..	d
76.5	101	29.72	S. W. fog.	Sq. cum.	..	..	.78	..	..	e
79	100	29.766	Ditto	Cumuli.	..	..	.83	S. W. lt.	Clear.	f
80.5	88.5	29.58	Ditto	Ditto	29.78	..	.85	Ditto	Ditto.	g	
83	96.5	29.81	Ditto	Ditto	.73	..	.84	Ditto	Ditto.	h	
79.5	97.5	29.71	S. by W. lt.	Ditto	.75	..	.78	S. E. f.	Sqs. lvg. & rain.	i	
78	92.5	29.77	W. N. W. lt.	Ditto	..	..	.82	S. W. lt.	Clear.	j
80	93.5	29.71	S. S. E. f.	Ditto	.71	..	.74	S. lt.	Cumuli strati.	k	
81.5	97.5	29.646	Ditto	Ditto	..	..	.74	Ditto	Clear.	l
83.5	99.5	29.67	S. E. lt.	Cumuli.	..	..	.76	..	Cumuli-strati.	m
82.5	97	29.64	Ditto	Ditto	..	..	.77	S. W. f.	Cumuli.	n
74.5	75.5	29.64	Ditto	Ditto	.68	..	.71	N. b. W. lt.	Strati.	o	
77	80.5	29.64	S. W. lt.	Cumuli.	.87	..	.69	Ditto	Ditto.	p	
80	92	29.67	S. by E.	Den. clds.	..	..	.75	Ditto	Ditto.	q
82.5	91.5	29.72	S. W.	Cirri-st.	..	..	.81	S. W. lt.	Cirri-strati.	r
83	93	29.766	Ditto	Cumuli.	..	..	.83	Ditto	Cumuli-strati.	s
81	93.5	29.78	Ditto	Ditto	..	..	.85	Ditto	Cirri-strati.	t
..	..	..	N. W.	Den. clds.	..	..	.82	Ditto	Clear.	u
83	89	29.80	S. W. lt.	Strati.	.90	..	..	..	..	v
77.5	81	29.76	S. lt.	Cirri-st.	..	..	.76	S. W. lt.	Cumuli-strati.	w
77	79.5	29.68	..	..	..	..	.78	Ditto	Ditto	x
78.5	83	29.714	..	..	..	..	.80	Ditto	Ditto	y
79	84	29.704	S. W. lt.	Cumuli.	..	..	.81	Ditto	Ditto	z
79	83.5	29.72	Ditto	Ditto	..	..	.76	Ditto	Ditto	z
77	79	29.70	Ditto	Ditto	..	..	.77.5	Ditto	Ditto	y
77	79	29.72	Ditto	C.-cum.	..	..	.78	Ditto	Clear.	y
2146.5	2460.5	802.356	627	747	207.85	1934.5	2032	744.39	
79.5	91.130	29.717	78.4	83	29.761	77.38	8128	29.774	

See next page.

Meteorological Remarks for the month of May, 1853.

-
- a* Cool fresh air from W. N. W.
 - b* Lt. fleecy clouds.
 - c* Cool fresh air.
 - d* Cool fresh light, almost calm.
 - e* Cool breeze.
 - f* Sky free from clouds.
 - g* Strong breeze.
 - h* Scattered cumuli.
 - i* Wind variable.
 - j* No rain to-day.
 - k* Light breeze.
 - l* Close and sultry.
 - m* 1.8 Fell last night during above 1 hour and a half.
 - n* Heavy rain. Rain just ceased fallen for 4 hours.
 - o* Rain just ceased, fair.
 - p* Dense clouds. Fair and less clouds.
 - q* Fine but close. Close and sultry scattered cumuli.
 - r* Very sultry, fine breeze, cumuli and light air.
 - s* Hazy, scattered cumuli.
 - t* Ditto.
 - u* Ditto.
 - v* Dense clouds—rain.
 - w* Fine morning, light air.
 - x* Heavy rain after mid-night, rain.
 - y* Fine breez.
-

The weather this month has been unsettled, cloudy and frequently wet.

Squalls of wind and rain with lightning at sunset and during the nights.

Prevailing winds in the early part of the month in the morning W. N. W. S. W. and W. S. W. in the afternoons. Latterly prevailing throughout the 24 hours in the S. W.

Up to sunrise of 1st June .04 inches of rain have fallen.

The Barometer is by J. Newman 122, Regent St. London.

Cap. action + .046.

Capacities 1-58.

Temp. 32° Farh.

Neut. point 29532.

Height of Mercury from the ground six feet.

Abstract of Meteorological Observations for the month of June, 1853.

Rangoon, 9th July, 1853.

Bulbs.	Thermometer Sunrise.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer Sunset.			Thermometer 9 P. M.			Remarks.
	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	
Wet.....	81	74.5	76.963	82	75	78.655	81.5	76	79.8619	83	75.5	79.24	78	75	77.125	79.5	75.5	77.932	Prevailing winds this month South and S. W. cloudy weather with fresh breezes and frequent rain. 15.01 inches fell on 26 days. The heaviest falls were on the 3d, 7th, 15th, 24th, and 30th of the month.
Dry.....	83	75.5	78.278	85	76.5	80.862	89.5	77.5	83.3704	89	77.5	82.46	82	78	80	82	77	79.363	
No instrument.	29.85	29.61	29.748	29.89	29.66	29.791	29.814	29.64	29.726	29.81	29.51	29.715	29.84	29.61	29.7075	29.81	29.55	29.749	
	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	Maximum.	Minimum.	Min. of pre- ceding ob- servations.	
	Barometer Sunrise.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer Sunset.			Barometer 9 P. M.			

J. FAYRER, M. D. Asst. Surgeon,
Field Hospital, Rangoon.

Date.	SUNRISE.						9 A. M.						NOON.					
	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Rain.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.		Force and direction of Wind.	Aspect of Sky.	Thermometer.				
	Wet.	Dry.				Wet.	Dry.			Wet.	Dry.			Wet.	Dry.			
1	77	78	Cirro-strati.	S. W. lt.	0.80	80.5	83	29.818	S. W. lt.	Cum. strati.	80.5	80.5	S. W. lt.	Cumuli.				
2	78	79	.....	.....	0.22	80	82	29.806	.....	.....	79	80	.....	Strati.
3	76.5	77	.....	.....	1.04	79	81	29.73	.....	.....	80.5	85	.....	.....		
4	76.5	77	Cirro-strati.	.....	0.35	77	79	29.66	.....	.....	79.5	86	.....	Cumuli.
5	79	80.5	Cum. strati.	S. W. lt.	0.25	81	85	29.68	S. by W. lt.	Cum. strati.	79	81	S. W. lt.	Cum. strati.				
6	77	78.5	Strati.	Ditto	0.94	78	80	29.682	.....	.....	81.5	83	.....	.....		
7	77	78.5	.....	.....	0.96	78	80	29.78	W. N. W.	Strati.	77	78	.....	Strati.	
8	77	78	.....	.....	0.80	79.5	80	29.824	W. S. W. lt.	.....	81	83	.....	.....		
9	..	..	.....	.....	.35	79	80	29.80	.....	.....	81	84	.....	.....		
10	78.5	80	.....	Cloudy.	.10	80	82.5	29.78	.....	.....	81	85	.....	.....		
11	80	80.5	Calm.	.....	.05	81.5	82	29.79	.....	Cumuli.	81	89.5	S. W. stdy.	Cumuli.	
12	81	83	Cirro-Cum.	Hazy.	.00	82	85	29.86	.....	Cirro-strati.	81.5	82	Ditto lt.	Cum. strati.			
13	77	77	S. W. lt.	Strati.	.55	79.5	79.5	29.89	.....	.....	80.5	82.5	.....	.....		
14	..	..	.....	Cumuli.	.00	78	81	29.84	.....	.....	80	82	.....	.....		
15	78	80	.....	Strati.	.10	80	82	29.84	.....	.....	81.5	88	S. W. lt.	Cumuli	
16	78.5	80	.....	.....	.60	79	82	29.83	.....	.....	80.5	85.5	.....	.....		
17	77	78	.....	.....	.10	78	79	29.78	.....	Strati.	79.5	82.5	.....	Strati.
18	77.5	79.5	S. E. lt.	Cirro-st.	.30	78	80.5	29.80	Steady.	Cumuli.	80.5	84.5	S. W. fog.	Ditto				
19	76.5	78	S. W. lt.	.....	1.75	77.5	79	29.86	.....	Strati.	79.1	84	Ditto lt.	Cum. strati.		
20	75	76	.....	Rain.	.45	77.5	79	29.88	.....	Cumuli.	80.5	87	Ditto lt.	.....			
21	79	80	.....	.....	.32	80	83	29.81	.....	.....	..	..	.....	.....
22	75	78	.....	.....	.00	79	82	29.82	.....	.....	81	85	.....	.....		
23	78	79	.....	.....	.90	79	81	29.81	.....	.....	80	84	.....	.....		
24	74	76	.....	.....	.12	77	80	29.78	W. N. W.	.....	76	77.5	.....	.....		
25	75	77	S. W. lt.	Cumuli.	0.12	77	81	29.72	.....	Cumuli.	78	83	.....	.....		
26	*	76	.....	.....	0.00	78	81.5	29.71	.....	Ditto	78	84	.....	Cumuli.
27	75	77	S. W. lt.	.....	0.10	77.5	80.5	29.74	.....	Cirri.	78	84	.....	Strati.	
28	75.5	78	.....	.....	0.10	77.5	80.5	29.71	.....	Strati.	..	..	.....	Ditto
29	74.5	75.5	.....	Cum. st.	0.51	..	..	..	.....	.....	..	..	.....	Ditto
30	75	75.5	.....	.....	1.62	75.5	76.5	29.77	S. W. lt.	Strati.	80	82.5	S. W. lt.	Ditto		
Total.	1978	2113.5	.....	.....	15.01	22.81	234.5	863.94	.....	.....	21.56	22.51	802.602	.....			
Mean.	76.963	78.278	.....	.....	50.034	78.655	80.862	29.791	.....	.....	79.8619	83.3704	29.726	.....			

3 P. M.		SUNSET.		9 P. M.	
Thermometer.		Thermometer.		Thermometer.	
Wet.	Dry.	Wet.	Dry.	Wet.	Dry.
79.5	81.5	79.75	81.5	79.5	80
80	84	29.70	..	75.5	77.5
79	81.5	29.61	..	77	78.5
81	86	29.51	78	79	82
79.5	83	29.62	..	77.5	79
77	78.5	29.64	..	79.5	80.5
80	81.5	29.73	..	77.5	77
79.5	81	29.75	..	77.5	78.5
81	85	29.78	..	79.5	81
82	85	29.69	..	81.5	82
80	89	29.76	..	77.5	77.5
83	84.5	29.78	79	77.5	29.80
82	83	29.75	..	78	80
78.5	81.5	29.72	..	79	82
80.5	88	29.73	78	79	82
77.5	81.5	29.71	..	..	..
78.5	82.5	29.72	..	79	80.5
76	79	29.78	..	78	82
79	81	29.81	..	79	80.5
78	81	29.81	..	79	80.5
77	79	29.76	..	78	82
..	..	..	..	76	77
..	..	..	..	81.5	80.5
..	..	..	..	76	77
..	..	..	..	76	77
80	85	29.71	..	81.5	80.5
78	79	29.64	..	76	77
75.5	77.5	29.68	..	76	77
79	83	29.73	77.5	78	80
1981.	2061.5	74.287	308.5	1714.5	1746.
79.24	82.46	29.715	77.125	77.932	79.3632

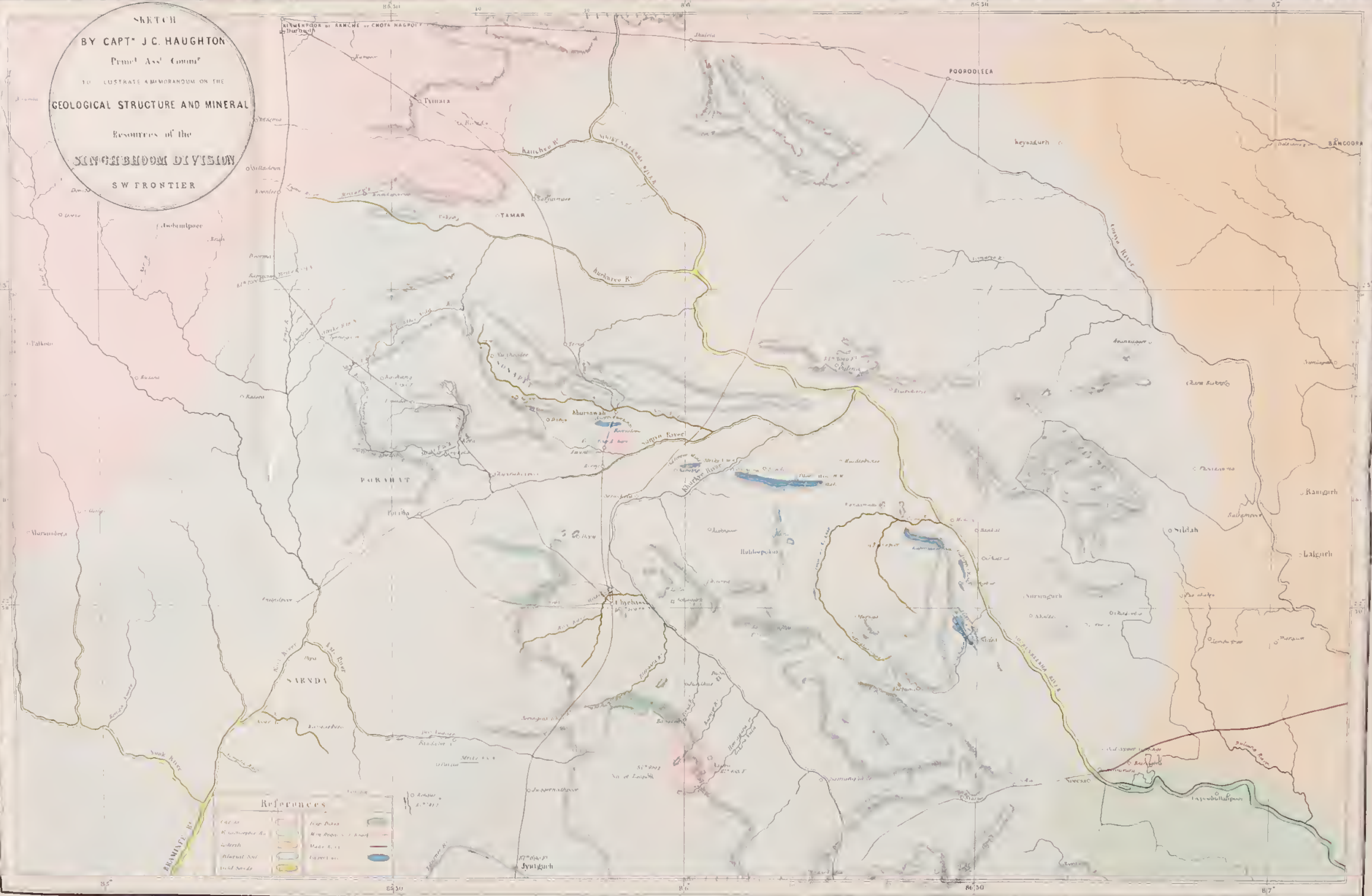
Force and direction of Wind.	Aspect of Sky.	Remarks.
S. W. lt.	Cloudy.	Fine morning, but coldy.
..	Fine cl.	Ditto.
..	Cirri.	Cloudy, rain just over.
..	..	Hazy. [gan at 2 P. M.
..	Den. clids.	Shower just over; be-
..	..	Rain. and thunder.
..	..	Rain.
..	..	Light rain.
..	..	Dense clouds, sultry.
..	..	Fine day, ditto.
..	..	Light shower.
N. W. lt.	Strati.	Fair—cloudy. [apprg.
..	..	Fine, afternoon shower
Calm.	C.-cum.	Fine morning. [day.
..	..	Light shower yester-
..	..	Light rain, fair sultry.
..	..	Rain at night.
S. W. lt.	Strati.	Rain.
..	..	Light rain.
S. W. lt.	Cumuli.	Sultry.
..	..	Fair.
..	..	Ditto.
W. S. W. lt.	Clear.	Ditto.
..	..	Ditto.
..	Strati.	Ditto.
..	..	Rain.
..	..	Fair.
Calm.	Clear.	Fair.
..
..

Meteorological Remarks for the month of June, 1853.

Prevailing winds this month South and S. W. cloudy weather with fresh breezes and frequent rain 15.01 inches having fallen in 26 days.

The heaviest falls on the 3d, 7th, 15th, 24th, and 31st of the month.

SKETCH
 BY CAPT. J. C. HAUGHTON
 Prinl. Ass' Commr
 TO ILLUSTRATE AN MEMORANDUM ON THE
GEOLOGICAL STRUCTURE AND MINERAL
 Resources of the
SINGAPORE DIVISION
 SW FRONTIER



References

Cap. 20	Top. Dikes	Blue
W. Singapore R.	W. Singapore R.	Red
Silber	W. Singapore R.	Green
Mineral Soil	W. Singapore R.	Yellow
W. Singapore R.	W. Singapore R.	Black
W. Singapore R.	W. Singapore R.	Blue

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